

# WOMEN AND AIDS

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AIDS has serious and often painful implications for women in their role as actual or potential mothers. A woman with AIDS will be hindered by ill-health in looking after her children. The physical pain she suffers will be compounded by emotional stress if she is unable to find someone to assist in caring for her children. Fortunately it is possible to reduce at least some of the special difficulties facing women as a result of the AIDS epidemic, but this will require initiative, effort, commitment and co-operation from people in all societies. This article deals with pregnancy and AIDS, breast-feeding and AIDS, choice of pregnancy for couples with infection, among other aspects of the disease.

**A**QUIRED Immuno-Deficiency Syndrome (AIDS) is a disease caused by a virus. It is a communicable disease but is different from other communicable viral diseases of the human beings. It destroys the body's power to protect itself against various diseases and certain types of cancers.

## What is an Infection and Infectious Disease?

Many disease-producing germs and viruses are existing in and around us. Germs and viruses are tiny living organisms visible only with the help of a microscope. We cannot see them through our naked eye. The entry and development or multiplication (increase in numbers) of germs in the human body is called *infection*. The term also implies that body's defence system is called upon to protect body from the invasion of germs. The disease which results from the invasion of germs and is capable of spreading from an infected person to other persons is called *infectious* or *communicable disease*.

## HIV Infection

AIDS is an infectious disease. The name of the virus responsible for causing AIDS is Human Immuno-Deficiency Virus (HIV). This virus is different in its mode of producing the disease as compared to other viruses. The virus after entering the human blood attacks and gradually destroys the body's Immune (defence) mechanism system. As a result, the immune system of the person infected with HIV gets weakened over the years.

## How AIDS Spreads in the Human Population?

AIDS virus is present in all the body fluids of infected human beings. AIDS can be caused only if HIV virus enters the blood stream of human body. There are four main modes of spread:

### (1) Sexual transmission

AIDS can spread through sexual intercourse among Homosexuals (sex between man and man) and heterosexuals (sex between a man and a

woman). The virus can be transmitted from one infected person to his or her sexual partner. HIV is present in the semen of man and vaginal secretions of woman.

### (2) Through infected blood and blood products

The virus can be transmitted by the transfusion of infected blood and blood products.

### (3) Through infected needles, syringes and surgical instruments

AIDS can be transmitted through the use of infected needles, syringes or surgical instruments. It can also spread by sharing of needles by the intravenous drug addicts.

### (4) From infected mother to her newborn baby

The virus can also spread from the infected mother to her newborn baby during pregnancy, at the time of birth or after the birth of the baby.

## Signs and Symptoms of AIDS

Every one infected with HIV (carrying of virus) may not develop

the symptoms of disease but he/she could still transmit the disease to others.

1. Persistent increase (for more than three months) in the size of the lymph nodes (small hard swellings) in several sites of the body.
2. Unexplained weight loss or more than 10% of the body weight.
3. Prolonged fever where cause is not known.
4. Night sweats.
5. Severe forms of herpes virus infections.
6. Thrush on the tongue (fungal infection of tongue); and
7. Certain skin cancers.

#### When one should suspect AIDS

One should go in for blood test for AIDS if one fulfils following three criteria:

- (1) A person suffering from any one or more of signs and symptoms given earlier.
- (2) A person who is under the treatment of a qualified medical practitioner for more than a month and is not responding to treatment.
- (3) A person who has history of:
  - (a) unprotected sex (sex without the use of good quality condom)

*or*

  - (b) casual sex with unknown person or a prostitute

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### The HIV infected mother should continue to breast-feed her baby even though there is slight added risk of her infant becoming infected with HIV.

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- or*
- (c) has received repeated blood transfusions

- or*
- (d) drug addicts

- or*
- (e) wives whose husbands are already HIV positive, as infected husbands have 100% chance of passing on the HIV infection to their wives.

#### Pregnancy and AIDS—Facts

A woman infected with HIV:

- (1) Can lead a normal life.
- (2) Has the same chances of getting pregnant as a non-infected woman as HIV infection does not lead to infertility.
- (3) However, they should avoid becoming pregnant, as they can pass on the infection to the child.
- (4) Pregnancy may increase the risk of her actually developing AIDS instead of just carrying the virus.
- (5) An infected pregnant woman can pass on HIV virus to her baby during pregnancy or shortly after child birth. Such a child may also develop severe illness during his/her first year of life. A majority

of these infected babies will not survive until their fifth birthday.

#### Breast-feeding

Breast milk has many substances in it that protects an infant's health. The HIV infected mother should continue breast-feed her baby even though there is slight added risk of her infant becoming infected with HIV.

#### Choice of Pregnancy for Couples

Various situations may arise depending upon the infection or full-blown disease present in the partner/partners.

##### First situation

**Wife carrying the virus but not suffering from the syndrome and husband is not infected:**

- (a) They should continue to have sexual relations by using good quality condom.
- (b) Preferably she can get pregnant by artificial insemination with semen from her husband as donor.

##### Second situation

**Wife is suffering from full blown AIDS but husband is not infected:**

- (a) They should continue to have sexual relations by using good quality condom.
- (b) She should not get pregnant at all.

(Contd. on page 282)

# IMPACT OF HIV INFECTION IN WOMEN

DR PREMA RAMACHANDRAN

*Within a short span of five years we have successfully assessed the magnitude and nature of impact of HIV infection in women and children. Never before have we learnt so much in so short a time on a truly global scale. These data have been used to draw up an effective logical intervention programme to take care of the infected and to contain HIV infection. The population has, by and large, recovered from the panic reaction. It is encouraging to note that some of the high risk groups have so rapidly responded to health education, that within this short period of a decade, there is a fall in STD rates and AIDS rates in USA and Canada.*

*The scientists are untiring in their search for curative drugs or vaccine and bound to succeed soon. The physicians have shown that they have not forgotten the art of healing; they have provided, care, comfort and alliviated suffering.*

*We in Asia and Pacific have a special responsibility. We have to act now to ensure that this epidemic does not inflict major damage on half the world's population—we must succeed in this effort. If we do, 21st Century will look back on AIDS pandemic not as a major calamity that befell mankind, but, as the agent that provoked renaissance of the science and art of medicine and resurgence of responsible population, willing and able to take care of their health.*

THE second half of the 20th Century witnessed tremendous improvement in maternal and child health. Improved diagnostic tests, anaesthetic and operative techniques, availability of banked blood, antibiotics and other drugs gave physicians an unparalleled opportunity to tackle health problems of women and children. Efforts to reach services to the needy through primary health care approach were making a headway. Health policymakers, professionals

and public assumed that progressive global improvement in health status is inevitable and health for all will be achieved, if not by 2000 AD, at least a couple of decades later.

With hindsight, one could see that the widespread availability of contraceptives to prevent pregnancy and antibiotics for treatment of Sexually Transmitted Diseases (STD), had led to behavioural changes in the population and increased sexual promiscuity and the stage was set for a potentially explosive STD epidemic.

Taken in this perspective, AIDS pandemic has all the inevitability of a Greek tragedy, but it did come as a rude shock to us.

However, once the initial shock and panic reactions were over, mankind demonstrated its capability to meet the new challenge. Within a short period of a decade global epidemiological data to assess the magnitude and type of problems have been obtained. Effective intervention programmes have been drawn up to minimise and contain the adverse effect of HIV infection.

By mid-eighties it was realised that women and children are hard hit by AIDS epidemic. A rapid assessment of the impact followed and today we have global data on epidemiology, pathophysiology and clinical manifestation of AIDS in these two vulnerable segments of population. Measures to minimise the adverse impact have been defined. These include provision for care of AIDS cases and seropositive persons, strengthening of MCH care and supportive services and health education. A brief review of the impact assessment and intervention measures follows:

### **Epidemiology of HIV infection in women and children**

AIDS was described first in 1981 among homosexual men in USA. Homosexuals and IV drug addicts were the largest group of AIDS victims in USA. The fact that HIV spreads through heterosexual contact and is passed from mother to infant were recognised in mid-eighties. During the last five years special efforts have been devoted to obtain information about the magnitude to the problem in women and children. WHO's global programme on AIDS has been the nodal point for collection, collation and dissemination of global epidemiological data on impact of HIV on women and children. Some epidemiological data has also become available at the national level in almost all countries of the world.

Three major modes of transmission of HIV, sexual, blood borne and perinatal occur world wide. Based on the probable period of extensive spread of HIV in the population and the relative frequency of the three modes of transmission of HIV, **three broad epidemiological patterns** of HIV infection has been described by W.H.O.

### **Epidemiological patterns**

In *Pattern I* countries most of the reported AIDS cases in the eighties were homosexuals and IV drug users. Extensive, explosive spread of HIV in these segments of population probably began in late seventies and AIDS cases started coming up in early eighties. Heterosexual and perinatal transmission was recognised in mid-eighties and since then these contributed to increasingly higher proportion of reported AIDS cases; however women and children still form a relatively small proportion of reported AIDS cases. This pattern is seen in North America, Western Europe and Australia.

In *Pattern II* countries heterosexual promiscuity is mainly responsible for the spread of HIV infection. Men and women are equally affected. As contraceptive use is low, pregnancies and perinatal transmission is a major problem. Parenteral transmission due to transfusion of unscreened infected blood transfusion is yet another worrying issue. Extensive spread of HIV probably began in mid 70s and AIDS cases were recognised from early eighties. The pattern is seen in Carribean and Sub-Saharan African countries. Many Latin American countries were earlier classified as belonging to *Pattern I* but by mid eighties there was substantial increase in reported heterosexual transmission, so that today these countries are classified as being *Pattern I/II*.

Countries belonging Asia and Pacific, Eastern Europe, North Africa and Middle East are currently classified as belonging to *Pattern III*. In these countries the spread of HIV began in early or mid eighties and very few cases of AIDS are reported till '89.

However, indigenous spread of HIV has been documented in most of these countries. From sero-surveil-

lance carried out in the last two years, discernible patterns of spread is emerging in some countries, e.g., data from India indicate that heterosexual promiscuity is the major mode of transmission of HIV; in Thailand I.V. drug use and heterosexual promiscuity have been implicated in spread of HIV infection. Information from other countries are at the moment insufficient to indicate predominant modes of spread of HIV infection.

### **Magnitude of the problem**

Estimates regarding magnitude of HIV infection and AIDS cases are essential to plan necessary intervention measures. Initially almost all epidemiological data and estimates of prevalence were based on the reported number of AIDS cases. This however was unsatisfactory because there were tremendous variations in the reported data between countries. Yet another problem was that current AIDS case load provided some information of magnitude of infection a decade earlier and not the situation at present. Sero-surveillance among asymptomatic individuals belonging to high risk and vulnerable groups are likely to provide an accurate picture about prevalence and mode of transmission at the time of survey. However, sample selection for such surveys have to be done with great care, because HIV prevalence of infection is not randomly distributed. Using all available data on AIDS case reporting and sero-surveys. WHO's global programme of AIDS has estimated the magnitude of HIV infection and AIDS cases in different countries and continents. To estimate sero-prevalence of HIV infection in women WHO uses available national/regional estimates of HIV infection and male female ratio reported in AIDS cases or large community surveys. Estimation of number of infected infants is done using a two step procedure; first the number of births

among HIV infected women is calculated from the available data on seroprevalence studies and age specific fertility rates in each country; then number of infected infants are calculated on the assumption that 25% of the infants born to HIV infected women are infected at birth.

According to WHO estimates there are eight million HIV infected persons in the world. Of these more than three million are women; 80% of HIV infected women live in Sub-Saharan Africa. Only 200,000 HIV infected women are from countries in Eastern Europe. In Sub-Saharan Africa prevalence of HIV infection in women is in 40. In sharp contrast the rate is only 1 in 3500 women in the *Pattern III* countries. The vast and populous countries of these regions have, perhaps for the first time in the history of mankind been given the opportunity to contain and control a communicable disease, very early in the course of epidemic. It is, therefore, essential that we do make the best use of this great opportunity of the millennium and succeed in containing HIV infection and minimising its ravages.

Already 225,000 women and 290,000 infants have developed AIDS; given the type of health care available majority are likely to succumb by one year. It is estimated that by 1992 the figures are likely to go upto 600,000 in each category and put further strain on already severely strained resources of these countries.

In 1989 an estimated 1.5 million uninfected infants were born to HIV infected women in these countries. The fate of these children is also a source of concern because most of them are likely to lose one or both their parents as a result of AIDS and become orphans. This figure is also likely to double by the year 1992. Providing appropriate support

to these homeless waifs until, they become adults is a task that is likely to tax the social welfare departments to the almost.

### HIV Infection in India

Realising the potential threat posed by HIV infection and the urgent need to find out whether HIV infection has reached India, the Indian Council of Medical Research initiated sero-surveillance among a symptomatic persons belonging to high risk groups in Oct. 1985. In the next six months over 3000 persons from high risk groups (HRG) were screened; 10 seropositive prostitutes were detected. It was obvious that HIV infection has entered in India. It is noteworthy that the first case of AIDS in India was reported only in May 1986. In May 1986 Council initiated the National Sero-surveillance for HIV infection to define the magnitude and major mode of transmission of HIV infection. The surveillance work was carried out by a national net work of 40 centres.

Within a short span of 18 months it became obvious that the seroposi-

tivity rate was low about 4/1000. Heterosexual promiscuity was the major mode of transmission. Two disquieting trends were noticed: first was a rising sero-positivity rate in promiscuous men and women; second detection of seropositive pregnant women—among low risk AN clinic attending population. These findings led to further intensification of sero-surveillance and case detection.

According to the reports received by the ICMR, till 31st August, 1990, 5,30,338 persons have been screened and 3383 were sero-positive. Overall seropositivity rate remained low (6.4 per 1000). The rise in seropositivity rate noted in 1990, however was due to two factors: seropositivity rate among I.V. drug addicts detected in North Eastern Region is about 30%. A similar high seropositivity rate has been reported in prostitutes in Bombay and Madras. Seropositivity rate among men attending STD clinics in these cities now ranges between 5 and 10%. Among antenatal clinical population, seropositivity rate is between 1—5/1000.

TABLE I  
Details of sero-positive individuals detected

	Males	Females	Total
<b>Indians</b>			
Heterosexually promiscuous	689	1161	1850
Homosexuals	6	—	6
Blood donors	618	6	624
Patients on dialysis	5	0	5
Antenatal mothers	—	10	10
Recipient of blood/bld. pdts.	52	7	59
Relatives of HIV patients	13	20	33
Suspected ARC/AIDS cases	31	9	40
Drug users i/v	422	14	436
Others	156	38	194
Sub-total	1992	1265	3257
<b>Foreigners</b>			
Students	66	13	79
Others	36	11	47
Sub-total	102	24	126
Total	2094	1289	3383

Profile of seropositive persons (Table I) shows that heterosexual promiscuity is the major mode of transmission and male female ratio is almost 1:1. Data from AIDS cases confirm this trend. In our country contraceptive use is very low. It is hardly surprising to note that right in 1986 pregnancies in seropositive women were reported and the number of seropositive pregnant women and infants keep steadily going up.

Prior to HIV epidemic, India and Sub-Saharan Africa had similar MCH profile. The mode of transmission of HIV in these two areas are similar. The major difference is that HIV entered India a decade later. The current seropositivity rates in India, 30% among prostitutes, 5-10% among STD patients and 2-3/1000 in ANC are essentially similar to those computed for some *Pattern II* countries in early eighties.

So in the absence of effective intervention programmes it is possible that India will have to face by 2000 AD problems currently faced by *Pattern II* countries. However, timely initiation of effective intervention programmes can avert this potential calamity.

Clinical surveillance for HIV infection was initiated alongwith serosurveillance in Oct. '85. The first pattern of AIDS was reported in May, 1986. Upto 31st Aug. 1990, 48 cases of AIDS have been reported. (Table II). Twentyone out of the 36 Indians with AIDS appear to have acquired the infection in India. During the last two years there has been a progressive increase in the proportion of AIDS cases who had acquired the infection in India. All the 36 Indians with AIDS have already succumbed to the disease. So far no child with AIDS has been reported in India.

### Impact of AIDS on mortality rates in women and children

In *Pattern I* countries despite the current low prevalence of HIV infection, AIDS has become an important cause of death in women and children. In US, AIDS ranked as 8th leading cause of death in women of child bearing age and 10th leading cause of death in children between 1-4 years.

Because of lack of reliable cause and age specific mortality rates, it is difficult to compute similar figures in *Pattern II* countries. Based on available information on prevalence of infection and course of HIV infection, WHO has developed a model to compute the impact of AIDS on under five mortality rate.

Their computation indicates that in a population with under five mortality rate of 100/1000, if 5% of pregnant women are infected, child mortality will rise by 9%. If 10% of mothers are infected child mortality rate will increase by 18%. If 20 are infected, mortality will rise by 36%. According to this computation if 10% of pregnant women are HIV infected under five mortality rate from AIDS alone will equal under five mortality rate from all cause in industrialised countries. In Uganda where HIV sero-prevalence is 24% HIV/AIDS caused a rise in the infant mortality rate by 38% and under five mortality rate has already doubled.

Prior to the advent of AIDS, UN had projected that the under five mortality rate would decline from 164/1000 live births in 1988 to 130/1000 by 2000 AD. Current estimates indicate that under 5 mortality was 166/1000 in 1988 and is likely to rise to 185/1000 by 2000 AD. HIV has thus wiped out the decline in under five mortality rate achieved by three decades of toil.

TABLE II  
AIDS cases in India

	Males	Females	Total
Indians	28	8	36
Foreigners	9	3	12
Total	37	11	48

#### Probable source of infection in Indians

	In India	Abroad
Heterosexual promiscuity	15	12
Blood transfusion	2	1
Blood products infusion	1	1
Homosexual contact	0	1
Spouse of an AIDS patient/sero +ve person	2	0
Professional blood donor	1	0
Total	21	15

Thus the global epidemiological data shows that:

- (a) Women form 1/3rd HIV infected persons
- (b) 26-50% of infants born to these women are infected
- (c) Nearly 50% of infected infants die by 2nd year
- (d) AIDS epidemic will result in steep rise in under five mortality

To contain further spread of HIV infection, the following strategies may have to be adopted:

- (a) Health education to reduce sexual transmission
- (b) Contraception to reduce perinatal transmission
- (c) Screening of blood prior to transfusion and proper sterilisation of syringes, needles and instruments to prevent blood-borne infection.

#### HIV infection and pregnancy

HIV infection shares with its oldest cousin, syphilis, the modes of transmission, uncertain, often prolonged asymptomatic phase, unpredictable clinical manifestations of varying severity affecting every organ system, the predicament of spouses of sexually promiscuous persons and the tragedy of intrauterine transmission. Available data from ongoing prospective studies indicate that pregnancy does not have any adverse impact on course of HIV infection. HIV infection *per se* does not appear to have any adverse effect on health of the pregnant women, course of pregnancy, labour, puerperium or lactation.

#### Intrauterine infection: Magnitude and consequences

HIV crosses placental barrier. HIV has been isolated from foetal

tissue even in first trimester. Consequences of early intrauterine infection with HIV are not well documented. Until now there had been no reports of increase in abortion rates in HIV infected individuals.

Available data indicate that intrauterine infection occurs in 25-50%. These rates are higher in Africa than in Europe and USA. There is some evidence that risk of IU infection is lower in asymptomatic women especially those who have a higher antibody titre. Risk of intrauterine infection is higher in women who are viraemic—these include women who had very recently acquired infection and those with AIDS. Risk of infection has been reported to be higher 60-80% in women who had earlier delivered an infected offspring.

In last two years there had been speculations whether use of drugs that reduce viraemia such as AZT and CD, during pregnancy would increase foetal salvage. The possible adverse effect of these drugs on pregnant women and foetus have to be weighed against potential benefits. There may be major ethical problems in conducting even clinical trials to test the hypothesis.

Maternal HIV infection is associated with a higher rate of premature delivery and intrauterine growth retardation. It is possible that at least part of this association might be attributable to co-existent risk factors like smoking, drug addictions and anaemia in HIV infected women.

There had been some case reports of congenital malformation among infants born to seropositive women although these observations have not been confirmed by prospective studies.

Progression HIV infection is rapid in infancy. Paediatric AID has a

rapidly fatal course and nearly all affected infants die by five years of age.

#### Screening for HIV in pregnancy

Screening for HIV during pregnancy along the lines of screening for syphilis during pregnancy has many ardent advocates. The major reason for screening for STD like syphilis in pregnancy is to provide therapeutic intervention to prevent IU infection. This justification does not exist for HIV. Counselling for MTP in early pregnancy in seropositive pregnant women may provide the rationale in some countries. However, in many countries abortion is not legal; women may refuse to undergo MTP. Apart from these several practical problems also come in the way of the proposed HIV screening.

In *Pattern II* countries most infected women do not belong to any recognisable risk group. Screening of all pregnant women is impossible because:

- (a) majority do not attend antenatal clinics
- (b) screening facilities are neither available nor affordable.

So most infected women will continue to remain undetected.

In contrast the number of infected pregnant women in *Pattern I* countries is small; most belong to HRG and know about HIV infection; most of them avail antenatal care. Facilities for screening are available and affordable. However, many may not consent to undergo screening. Thus it is unlikely that in the near future programme for wide spread or universal screening for HIV infection in pregnancy will be initiated.

### Management of pregnancy in seropositive women

The fate of the unborn child is the major reason for concern regarding HIV infection in pregnancy. All available data indicate that at least 25% of infants are infected at birth. Almost all infected infants will succumb to the disease by five years of age. The uninfected 75% are likely to be orphaned by five years of age and suffer all its adverse consequences. To prevent this calamity MTP in first trimester may be done if the patient desires it.

Women who desire to continue pregnancy should be provided with adequate, appropriate, antenatal, intrapartum and postnatal care. Intensive neonatal care facilities should be available for looking after the low birth weight neonates. Every effort should be made to counsel the mother to adopt appropriate contraception soon after delivery and teach her the importance of correct and consistent use of condoms. Stringent precautions should be taken to prevent accidental spread of HIV infection while providing health care. Steps to minimise suffering of the infant born should include provision for appropriate MCH care, home help, hospice facilities and orphanages.

### HIV infection and breast feeding

HIV has been isolated from breast milk. Intense research efforts over the last four years have resulted in documentation of a handful of instances where the infant might have been infected through breast milk. All these occurred in women who became infected due to blood transfusion in the postnatal period—an event which is unlikely to recur because of almost universal blood donor screening for HIV antibody. Thus transmission of HIV through breast milk is likely to become very rare.

All available data suggest that breast feeding will protect infected infants from infection and may prolong the survival period—so breast feeding is desirable in infected infants. However, tests for detection of infected infants are at the moment not readily available. So unless all infants born to sero +ve mothers are breast fed infected infants could not have the advantages unique to breast feeding.

In order to avoid the small potential risk of HIV infection through breast milk, some *Pattern I* countries have recommended that seropositive women should not breast feed. The fact that in these countries breast feeding is an uncommon among the segments of population currently affected by HIV infection and artificial feeding is available, affordable and safe have been often cited as reasons why these recommendations may be allowed to stay.

The situation in *Pattern II* countries is radically different. Majority of seropositive women do not belong to HRG. Infected mothers or infants cannot be detected. Breast feeding is essential for infant survival and growth irrespective of HIV infection status of the infant because infant food formulae are not affordable or safe. So breast feeding by biological mother should continue to be the infant feeding practice of choice irrespective of HIV infection status of mother or infant. Promotion of breast feeding should continue to be the national policy whether HIV status of the mother is known or unknown.

### HIV infection and contraception

It is imperative that safe and effective contraceptive care is provided for all seropositive women because of the known adverse consequences of HIV infection during pregnancy. In developed countries condoms and

spermicides containing nonoxynol-9 have been advocated because they afford protection not only against pregnancy but also against HIV infection. Reports suggest that there had been some reduction in the incidence of HIV infection among homosexuals in USA following correct and consistent use of condoms. However, in developing countries, acceptability and use effectiveness of condoms are at the moment very low. Incorrect and inconsistent use of condom could lead to a false sense of security and consequent increase in HIV infection rates and also result in unwanted pregnancies with all the attendant hazards to the mother-child dyad. Taking all these factors into consideration, it is essential that health education regarding advantage of condom use, the correct method of its use and need for its consistent use should be initiated to improve acceptability and use effectiveness of condoms.

There is very little information on possible beneficial or adverse consequences of use of oral contraceptive (OC) or intrauterine device (IUD) by HIV infected women. There have been speculations that potential adverse interaction might occur with immunodepression associated with OC use and increased susceptibility for pelvic infection in IUD users. Vasectomy and tubectomy do not appear to be associated with any adverse effects in HIV infected persons. For couples who have completed their family, these appear to be the methods of choice for contraception. In view of the known adverse consequences of pregnancy in HIV infected persons, it is essential to provide safe, effective, suitable contraceptive care to all HIV infected individuals. The choice of contraceptive method for the individual should take into account risks and benefits of the contraceptive method, lifestyles and

contraceptive preferences of the individual, availability of contraceptives and health care facilities available. However, in addition to use of contraception of their choice, all seropositive persons should be taught to correctly and consistently use condoms for reducing the risk of transmission of HIV. It is essential to ensure that needles, syringes and other equipment used for fertility regulation are properly sterilised before use.

In *Pattern II*, countries prevalence of HIV infection is quite high and clear cut high risk groups are not readily identifiable. Screening of all contraceptive advise seekers for HIV infection is not possible, because of limited laboratory facilities, lack of infrastructure and prohibitive cost. Thus in majority of cases contraceptive care will have to be provided without any knowledge of HIV infection status of the individual. The WHO expert group has recommended that under these circumstances contraceptive care can continue to be provided according to the existing guidelines, even though HIV status of the person is not known. It has been suggested that in countries where prevalence of HIV infection is high, and risk groups are ill-defined, it might be preferable that in addition to using contraceptive of their choice, all individuals irrespective of their HIV status might be advised to use condoms.

### SUMMARY

HIV Infection shares with its oldest cousin syphilis, the mode of transmission, uncertain often prolonged asymptomatic phase, unpre-

It is estimated that about 100,000 infected infants have been born and 50,000 of these will not survive second year of life. Obviously there is an urgent need to mount effective rationale feasible intervention programme to combat HIV pandemic, making optimum use of existing health and social welfare services.

dictable clinical manifestations of varying severity affecting every organ system, predicament of spouses of sexually promiscuous persons and tragedy of intrauterine transmission.

A million and a half of the estimated 6 million HIV infected persons are women in child bearing age. Most of them are apparently healthy and do not know that they are infected. In Asia and Africa many do not even belong to high risk groups.

It is estimated that about 100,000 infected infants have been born and 50,000 of these will not survive second year of life. In some part of Africa the decline in perinatal and infant mortality achieved by two decades of toil have already been wiped out by HIV infection.

Obviously there is an urgent need to mount effective rational feasible intervention programme to combat HIV pandemic, making optimum use of existing health and social welfare services.

Concious clear cut decisions need be made taking into account existant realities including availability, access, awareness and affordability of appropriate health care.

AIDS cases represent a very small fraction of HIV infected persons. Every effort should be made to

provide optimal care to them during acute infections and life threatening emergencies. In the chronic and terminal phases of illness, they may require hospice like facilities to provide continued care and comfort.

All seropositive women should have benefits of counselling and health education. Option regarding contraceptive care, use of AZT medical termination of pregnancy, provision of appropriate antenatal intrapartum and post natal care, should be clearly explained and appropriate care provided. All prophylactic and curative therapeutic procedures including elective and emergency surgery should be made available to all seropositive persons.

Though it is possible that HIV testing could be undertaken in recognised high risk groups, it is impossible to screen all pregnant women and infants. So majority of asymptomatic seropositive mothers and children will remain undetected. Available data suggest that advent of HIV infection and presence of undetected HIV infected persons in community, only serve to emphasise the need for providing optimum MCH care and does not in any way necessitate modification of existing guidelines for provision of MCH services.

(Contd. from page 274)

*Third situation*

**Wife not carrying the virus while the husband is either carrying the virus or is a full blown case:**

- (a) They should continue to have sexual relations by using good quality condom.
- (b) She should get pregnant only through artificial insemination by a non-infected donor with mutual consent if the couple desires to have a child.

*Fourth situation*

**1. Wife and husband both are carrying the virus but not suffering from syndrome, or**

**2. Wife is carrying the virus and husband is full blown case:**

- (a) They should continue to have sexual relations.
- (b) She can have pregnancy.

**How to prevent AIDS?**

1. To prevent AIDS, you should know your sexual partner well.

2. Use a good quality condom to prevent infection.

3. Follow the social customs of having sex within the bond of marriage.

4. Do not use unsterilized needles and syringes for injecting drugs.

If you are suffering from a disease which requires frequent injections like tuberculosis, insulin dependent diabetes mellitus, bronchial asthma, chronic bronchitis with emphysema, rheumatic fever and/or rheumatic heart disease, take your own boiled needles and glass syringe in a steel syringe case to the doctor to have the injection. The HIV is destroyed at 65°C while the water boils at 100°C. It is perfectly safe to use your own boiled syringe and needle to protect yourself and your family members from

AIDS and some other communicable diseases.

5. Observe the general principles of hygiene.

6. Be careful to avoid accidents or situations needing blood transfusions.

7. If need arises for blood transfusion, e.g. in haemophilics, request your near and dear one to donate for you.

8. Ask your relative/parents to accept blood only from authorized banks/Government blood banks.

9. To avoid getting addicted to drugs or to extra-marital sex, divert your activities to exercise-oriented entertainment like athletics, playing table tennis, etc.

10. Avoid experimentations in above acts.

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# AIDS—DIAGNOSIS AND CONTROL

DR D. SENGUPTA

Intensive epidemiological studies of HIV infection have shown that it is not transmitted in the community by casual or intimate non-sexual contact. There are only very few known cases of health care staff being infected through inoculation injuries, despite the fact that hundreds of people are known to have had penetrating wounds from instruments and needles used for HIV positive patients. The extremely low infectivity of HIV in health care workers where inoculation injury is relatively common emphasises the much lower risks in the community from patients with AIDS or asymptomatic carriers of HIV, says the author.

**A**IDS is a disabling and life threatening disease caused by Human Immuno-deficiency Virus (HIV) characterized by HIV encephalopathy, HIV wasting syndrome or certain diseases due to immune deficiency in a person with laboratory evidence for HIV infection, without certain other causes of immune deficiency.

This is the definition of Acquired Immuno Deficiency Syndrome—revised in 1987 by CDC Atlanta.

But for developing countries where laboratory facilities are meagre—WHO defined AIDS by the existence of at least two major signs associated with at least one minor sign, in the absence of known causes of immuno suppression such as cancer or severe malnutrition or other recognized etiologies.

## Major Signs

- (a) Weight loss 10% of body weight.
- (b) Chronic diarrhoea—one month.

- (c) Prolonged fever—one month intermittent or constant.

## Minor Signs

- (a) Persistent cough for one month
- (b) Generalised pruritic dermatitis
- (c) Recurrent herpes Zoster
- (d) Oropharyngeal candidiasis
- (e) Chronic progressive and disseminated herpes simplex
- (f) Generalized lymphadenopathy.

The presence of generalized Kaposi's Sarcoma or cryptococcal meningitis are sufficient by themselves for the diagnosis of AIDS.

## Transmission of HIV

Known routes of transmission:

- Inoculation of blood
- Transmission of blood and blood products
- Needle sharing among intravenous drug abusers

—Needle stick injuries, open wound and mucous membrane

—Exposure in health care workers

—Injection with unsterilized needles.

## Sexual

—Homosexual (male to male)

—Heterosexual (male to female)

## Perinatal

—Vertical from mother to foetus

—Intra-uterine

—Peripartium

## Routes investigated and not shown to be involved in transmission

—Close personal contact

—Household contact

—Work place

—School contacts

—Health care workers without exposure to blood

—Insect bite, mosquito bite, bed bugs, etc.

AIDS is not spread by coughing, swimming pools, sneezing, public toilets, doorknobs, mosquitoes, sharing cups, plates, books, pens, towels, etc., public telephones, donating blood, crying, shaking hands, hugging, kissing.

### Incubation Period

Data suggests that the incubation period for development of AIDS varies with the age of acquisition of HIV infection. In children who have perinatally acquired infection, high rate of progression of the disease is seen in the first few years of life. Children infected by transfusion of blood before five years of age may have incubation period less than two years. The incubation period is about eight years in cases of HIV infection by transfusion after five years of age. In haemophiliacs and homosexual the mean incubation period is 7-8 years.

The full blown AIDS develops within three years in 15-38% of asymptomatic individuals who have antibodies to HIV. 25% develop persistent generalized lymphadenopathy (PGL) and candidiasis or other AIDS related condition.

The diagnosis of AIDS is made from

- (i) Clinical manifestation
- (ii) Laboratory diagnosis.

### Clinical Manifestations

Four general categories of clinical manifestations:

- (i) due to direct effect of the virus
- (ii) related to opportunistic infection to HIV induced immune suppression

(iii) those caused by Kaposi's Sarcoma

(iv) those arising due to continued effects of HIV induced immune suppression and malignancy promoting effects of other viruses.

Manifestations of HIV infections are protean ranging from acute sero conversion illness to full blown AIDS.

Spectrum of HIV induced diseases may include one or more of the following—

- Acute sero conversion illness
- asymptomatic viral carriage
  - (i) with normal CMI
  - (ii) with abnormal CMI
- Persistent generalized lymphadenopathy (PGL)
- Acute thrombocytopenia
- AIDS related complex (ARC) and HIV constitutional disease.

Subacute Encephalitis (HIV dementia complex)

AIDS—opportunistic infection, malignancy.

The acute HIV infection develops within three weeks to three months following exposure and occurs in 10-30% of sero converted cases.

From the day of exposure to three weeks to three months the person is highly infectious, but he has no manifestations, even his blood test for antibodies are negative. This is known as "window period." Only highly sophisticated laboratories may culture the virus from the patient's blood. Only the patient might know that he is infected. The virus slowly produces progressive

damage of its target tissues namely T<sub>4</sub> cells of the immune system and the central nervous system (CNS).

### Acute Sero Conversion Illness

In about 15% of the persons acquiring HIV infection, an acute viral illness develops about six weeks after the entry of the virus in the body. Clinically resembles infectious mononucleosis with high fever, skin rash, headache, muscle pain, joint pain and axillary and cervical lymphadenopathy. Encephalitis and aseptic meningitis can occur. Illness is self limiting—lasts for about two weeks. Positive serological tests appear—hence acute sero conversion illness.

### Asymptomatic Carrier Stage

After the acute sero conversion illness, the individual becomes asymptomatic. Infected person remains in this stage for a long period (average five years) but it is potentially infectious and can spread through blood and body fluids.

### Persistent Generalised Lymphadenopathy

Defined as enlarged nodes at least 1 cm diameter or greater in two or more extra inguinal sites (non-contiguous) that persist for more than three months in the absence of any current illness or mediator known to cause enlarged nodes. Biopsy reveals non-specific lymphoid hyperplasia.

### HIV Constitutional Disease and AIDS Related Complex (ARC)

Within an average of 7-8 years, sometimes even earlier, individual who is seropositive starts—

- (i) Severe diarrhoea—recurrent
- (ii) night sweats

- (iii) fever
- (iv) weightloss  
— identified as ARC.

ARC is diagnosed in patients who present with any two or more clinical signs and symptoms along with two or more abnormal laboratory parameters (which persists for more than three months).

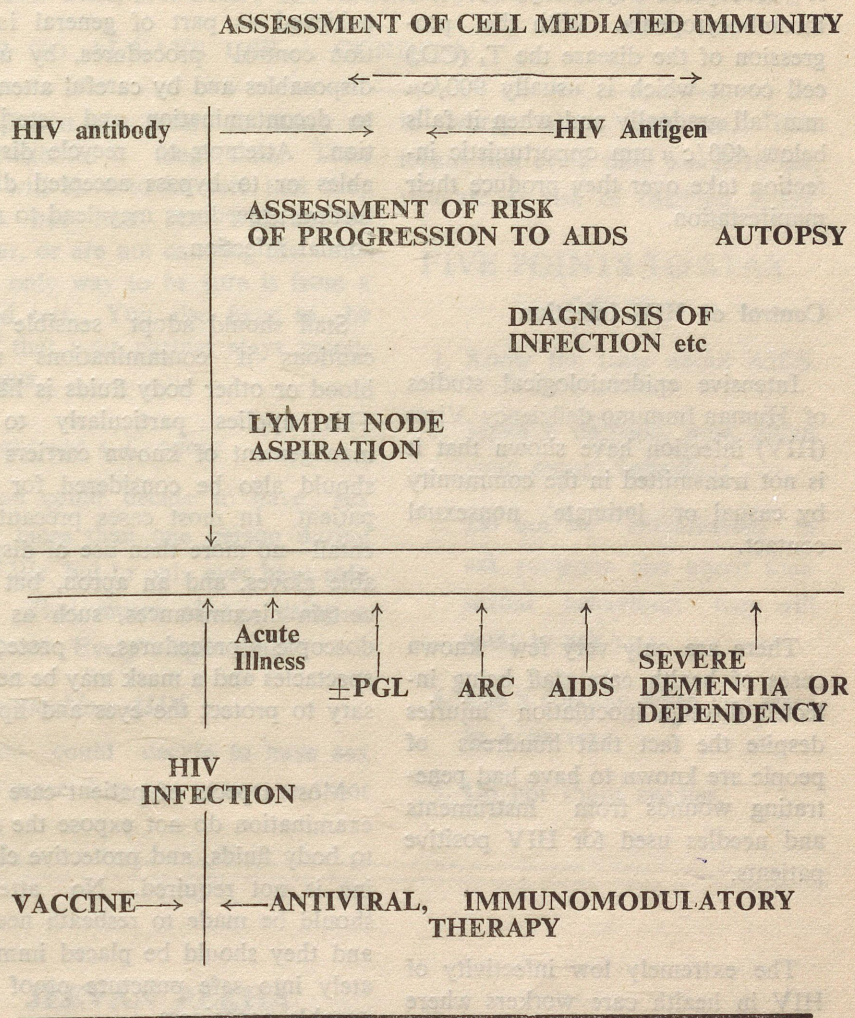
- Fever more than 38°C intermittent or continuous weightloss more than 10% of the basal body weight persistent generalised lymphadenopathy.
- Diarrhoea intermittent/continuous.
- Fatigue/night sweats.
- Lymphopenia, leucopenia and thrombocytopenia.
- Reduced helper cells.
- Reduced Blasto genesis.
- Cutaneous energy.

ARC heralds the onset of terminal phase of HIV infection. Some may develop minor opportunistic infection like oral candidiasis (thrush). This condition of ARC with minor opportunistic infection is known as constitutional disease.

#### Full Blown AIDS

Within a short time of ARC, the HIV infected individual goes down further. T<sub>4</sub> (CD<sub>4</sub>) cell count goes below (200/cμ mm) (normal count 900/cμ mm). A number of life threatening infections like candidiasis, cryptococcosis, pneumocystitis carinii, toxoplasmosis, typical or atypical tuberculosis, Amoebiasis and so on. Opportunistic cancers such as centralised and generalised aggressive forms of Kaposi's Sarcoma and high grade 'B' Cells—Lymphoma of the brain are also seen in the patients.

## THE SPECTRUM OF LABORATORY INVOLVEMENT IN HIV MEDICINE



#### Central Nervous System and HIV Laboratory Diagnosis

Main presentations are subacute Encephalitis or AIDS dementia complex, disturbance in thought process and behavioural abnormalities, AIDS myelopathy, spinal cord damage, sensory motor paralysis, AIDS neuropathy and polymyositis may be the manifestation.

#### Other System Involvement

Renal dysfunction (proteinuric with segmental and focal glomerulosclerosis), acute or chronic renal failure, congestive Cardiomyopathy average survival after onset of full blown AIDS is 18-24 months.

The antibodies against the virus HIV appears in the blood after 3-6 weeks of infection—the antibodies can be detected by ELISA test.

The confirmatory test of the ELISA is Western blot test which is much more sophisticated and confirmatory. The ELISA test is a screening test—if ELISA is +ve in the serum twice then to confirm infection Western blot test is done. Other laboratory parameters are tested—in the asymptomatic stage—only ELISA and Western blot test

may be positive but with the progression of the disease CD<sub>4</sub> (T<sub>4</sub>) lymphocyte count goes down there is leucopenia lymphopenia and thrombocytopenia. With the progression of the disease the T<sub>4</sub> (CD<sub>4</sub>) cell count which is usually 900/c $\mu$  mm fall gradually and when it falls below 400/c $\mu$  mm opportunistic infection take over they produce their manifestation.

### Control of HIV Infection

Intensive epidemiological studies of Human Immuno-deficiency Virus (HIV) infection have shown that it is not transmitted in the community by casual or intimate nonsexual contact.

There are only very few known cases of health care staff being infected through inoculation injuries despite the fact that hundreds of people are known to have had penetrating wounds from instruments and needles used for HIV positive patients.

The extremely low infectivity of HIV in health care workers where inoculation injury is relatively common, emphasizes the much lower risks in the community from patients with AIDS or asymptomatic carriers of HIV.

HIV positivity *per se* is not an indication for isolating the patient. It is important to isolate the patient, however, if he or she has other infections such as tuberculosis or Salmonellosis or if there is a likelihood of extensive exposure to body fluids—for example of body of extensive haemorrhage or severe diarrhoea. The control of spread of HIV infection

in hospital should be of a sufficiently high standard to eliminate any risk of patients to patient screened for HIV in hospital. This is achieved as part of general infection control procedures, by using disposables and by careful attention to decontamination and sterilization. Attempts to recycle disposables or to bypass accepted disinfection procedures may lead to nosocomial infection.

Staff should adopt sensible precautions if contaminations with blood or other body fluids is likely. This applies particularly to the management of known carriers but should also be considered for any patient. In most cases precautions entail—no more than use of disposable gloves, and an apron, but in certain circumstances, such as Endoscopic procedures, protective spectacles and a mask may be necessary to protect the eyes and lips.

Most aspects of patient care and examination do not expose the staff to body fluids, and protective clothing is not required. No attempt should be made to resheath needles and they should be placed immediately into safe puncture proof disposable containers.

Although there is little epidemiological evidence of increased risk, most hospitals assure that special care should be taken during surgery on HIV carriers. Presenting unnecessary exposure to body fluids and trying to reduce the best defence against infection which may be present but unsuspected in any patient.

There is no evidence that health care workers who are carriers of HIV present a risk to their patients. Attention to personal hygiene will ensure that there is no danger of

transferring blood or other body fluids.

The most important aspects of safety in the laboratory are education, training and prevention of inoculation and skin contact with body fluids. It is important to review all laboratory procedures to reduce the use of needles and the danger of exposure to glass fragments to a minimum. The disease of evidence of air home transmission means that HIV positive samples may be handled on the open benches. HIV carriers in the community present no risk to others from normal day to day contact. The combined effects of dilution, temperature, and detergent action assure that standard washing procedures will satisfactorily decontaminate cutlery, crockery and clothing.

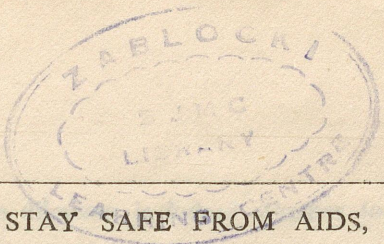
Although the dangers are remote, it is sensible to ensure that blood spillages (from anyone) are decontaminated with hypochlorite (bleach) and carefully cleaned up. The absence of evidence that saliva can transmit HIV means that nobody should withhold mouth to mouth resuscitation for some one who has suffered a respiratory arrest.

The foregoing have dealt with control of HIV infection are health care workers and laboratory workers.

For the general lay people two things are just to be remembered: Drugs and sex.

### Drugs

Injecting drugs is dangerous. It is not just the drug that is dangerous. Sharing a needle or syringe with someone else is a quick way



to catch AIDS. Just one prick can be enough. And then you have the AIDS virus in your blood for the rest of your life. You may develop AIDS related complex or full AIDS. You can pass AIDS to every one you have sex with, for the rest of your life.

**Sex**

Sex itself is not dangerous, but unsafe sex with someone who has the virus is. You cannot tell if someone has the virus without a special blood test. You cannot tell by the way a person looks or dresses or talks. Many people who have the virus do not even know it themselves. That is why AIDS is spreading.

**BE HONEST AND KNOW THE FACTS**

*Monogamy*

You could decide not to have sex with anyone until you have met

TO STAY SAFE FROM AIDS, YOU CAN CHOOSE NOT TO HAVE SEX, TO ONLY HAVE SEX WITH ONE SAFE PARTNER, OR TO ALWAYS USE A CONDOM.

the person you want to marry or live with for a long time. Then you will have to be sure that they have not had sex with anyone either, or are not carrying the virus. The only way to be sure is from a blood test. You also have to be sure that your partner stays monogamous.

*Always use a Condom*

You could decide to have sex with more than one person during your life, but to only ever have safe sex. That means always using a condom. Every single time.

*Risk catching AIDS*

You could decide to have sex with more than one person and not

to worry about safe sex. This means that every time you have sex, you are at risk of catching AIDS.

**FIVE POINTS TO STAY SAFE**

1. Know the facts about AIDS.
2. Make a decision, now, about your sexual behaviour.
3. Do not be embarrassed to ask someone else about their sexual behaviour; they will want to ask you.
4. Use a condom when you want to have sex.
5. Do not share needles.

**JEEVAN REKHA**

The Ministry of Railways, in association with Impact India Foundation, a voluntary organisation, is to launch a unique project "Jeevan Rekha", for free health care in rural and backward areas through "Hospital on Wheels". To begin with it will be a Pilot Project at 5 centres to operate in rural and backward districts of Bihar. "Hospital on Wheels" will function from three special railway coaches fully equipped with diagnostic, medical and surgical facilities at selected railway stations of Bihar. The Founda-

tion will run this hospital with the help of skilled doctors, technicians and other para-medical staff and offer free treatment of cases pertaining to sight, hearing and mobility. The hospital will also take up child immunisation and other health care programmes during its stay at each centre. "Jeevan Rekha Hospital on Wheels" will also provide in-patient beds for post-surgical care provided inside the special train.

—Yojana, Sept. 16-30, 1990

# ETHICAL ASPECTS OF AIDS/HIV INFECTION —To Test or not to Test

DR KHORSHED PAVRI

There is an urgent need to assess various risk factors that facilitate the transmission and spread of the virus of AIDS called HIV and then develop public health policy and appropriate strategies for its control. This article covers several ethical aspects pointing out an urgent need to review the present strategy of serological testing by an increasingly large number of Surveillance Centres without considering more appropriate alternatives.

"I would rather die of AIDS not knowing that I have it, than live in misery with the knowledge that I have it". This was the reply of one of the persons having recurrent Sexually Transmitted Diseases (STDs) and opportunistic infections, when told by a family physician to undergo an HIV antibody test<sup>1</sup>. On the other side, a completely healthy and a responsible individual was insisting for the test as he had undergone a bypass surgery in the U.S. in early 1980s. The reason was that if seropositive, he could warn his dear ones as well as his dentist and other attending doctors. Between the two, lie hundreds and thousands of persons in India who are not even aware of AIDS. Many are not yet prepared even to understand about this dreaded, almost fatal disease syndrome. They choose to remain ignorant about how it spreads and how it does not, and therefore, do not know how it can be prevented. This raises a major ethical issue of

an individual's right for freedom versus the health of a nation.

## Risk Factors

There is an urgent need to assess various risk factors that facilitate the transmission and spread of the virus of AIDS (called HIV) and then develop public health policy control. Risk assessment has to be made only after statistical evaluation of systematically collected epidemiological data. Appropriate and pragmatic strategies need to be developed, particularly to stop the spread among the most vulnerable population, namely, the urban and rural poor of India<sup>2</sup>. It is also important to check that "prejudices" do not masquerade as unbiased scientific opinions, just because they emanate from expert scientists/doctors. For example, controversies about whether patients actually died of AIDS or other causes such as tuberculosis, lymphoma or some unrelated cancers.

Since the patients were recognized as HIV carriers, such arguments are unfruitful because HIV, the virus of AIDS could spread just as effectively from carriers with other diseases as from patients with AIDS. Such statements are ethically untenable as they misguide the public and also the policy makers.

## To Test or Not To Test: A Dilemma

Dilemma involves a choice between unsatisfactory alternatives. Perhaps, in no other area of public health do we face such dilemmas as we do in the control of AIDS. This is illustrated below by describing some currently prevailing regulations and practices, ostensibly to prevent the spread of HIV/AIDS through the known modes of transmission.

## Sexual Transmission

The present practice is to concentrate only on female prostitutes

from detention centres or red light areas, ignoring the vast majority falling outside this net. Many girls are known to carry on their business as commercial sex workers (CSW) even while being transported by lorry drivers, a kind of "mobile units" for spreading STDs including AIDS. Numerous high class 'call girls', the gays or homosexuals and eunuchs etc., also fall outside the surveillance network. The present surveillance data are thus far from complete; despite the extremely high costs in time, money and manpower, we obtain at the best, extremely spotty data.

A dilemma concerns the questions of responsibility for serosurveillance of sexually transmitted AIDS. Should the ICMR Centres, mainly under microbiologists/immunologists be responsible, or venereologists, who come into daily contact with patients in STD clinics but who might not be fully conversant with the intricacies and interpretations of the laboratory tests. A legitimate doubt is also raised concerning serological tests and the present practice of accepting the results without much thought for quality control. The recent controversy about marked differences in seropositivity data among prostitutes—both at Bombay and Madras, and perhaps, those sent from Bombay to Madras—indeed raises serious doubts about their validity. Our policy makers need to justify their present pursuit of opening more and more 'Surveillance Centres' without any thought for proficiency and/or quality control. In the absence of these, it does not seem to be ethical to continue such practices without considering more suitable alternatives.

### **The dilemma is indeed whether to test or not to test**

Granted that the test was performed correctly and even confirmed by the Western blot, the question concerns what happens next. Many a time, the seropositives just cannot be traced. Even if traced, they may refuse counselling were it available. Therefore, an ethical issue concerns whether to test at all or consider the alternative of spreading the most appropriate health education not only to the CSWs but more particularly, to their clients. A service-oriented follow-up by providing effective condoms and training about their correct usage may yield a much more cost-effective strategy for controlling sexually transmitted AIDS. Further, such a pragmatic policy would also help in preventing other STD's, which are more amenable to treatment than HIV/AIDS.

### **Transfusion Associated AIDS**

An understanding of the natural history has led to the mandatory screening of donors of blood/blood products and organs for transplants. Compared to the sexually transmitted AIDS, there is no question whether to test or not to test but a straightforward policy of testing all donors as an effective control measure. The major goal is to use only the blood that has been tested and found not to react in ELISA for HIV antibody. Therefore, all reactive units are discarded as they may be HIV infected. ELISA kits currently available in the market are considered to give many false positives but few false negatives. Thus, several units will be discarded although they might have been uninfected thus increasing the cost. On the other hand,

in the absence of any standardized quality control or proficiency testing procedures, one cannot help but wonder about the consequences of missing some definite positives if false negatives are obtained. This is not a mythical problem, as we need to consider possible errors occurring at some step or other during collection, transport and testing of blood specimens and also during the various steps of storage and transport of ELISA kits to the Surveillance Centres.

The other, very important ethical issue relates to the reactive donor. The present policy of not informing the donor is formulated because of the possibility of informing a donor who may actually be 'false positive' and thus might get into an unwarranted panic. To confirm the test by Western blot is not recommended because it is very expensive and also not desirable to test large numbers of expectedly "false positive" sera. This indeed poses a dilemma; some pragmatic measures have recently been suggested by Dr Bharrucha particularly to deal with voluntary blood donors.<sup>3</sup>

### **Pregnant Women and Perinatal Transmission**

The number of HIV-infected women is indeed increasing though not to the extent it was recently reported in the news media, "every third housewife of Bombay will be found to be infected with HIV at antenatal examination".<sup>4</sup> It is important that projections for the future should be made only if epidemiological data reflect a realistic picture based on accurate data. Besides, the data should relate to the correct category, for example, female prostitutes on the one side—they also become pregnant—and,

pregnant housewives on the other.<sup>5</sup> It may initially be tempting to create a scare among the public so as to make them accept preventive measures. However, at best, it may have only a temporary effect, ultimately leading to a loss of credibility with serious consequences, i.e., non-acceptance by the public of all official projections/statements.

A recent controversy raised through mass media concerned a three-month-old baby who when tested was found HIV seropositive. The death of this baby of a prostitute created a controversial situation. The infant could have died of HIV or perhaps of some other disease. The unfortunate fact is that the baby who was not given much attention when alive was

given too much of it only after death. A major dilemma for infants is thus a specific diagnosis. We measure antibody to HIV in adults and provide a presumptive evidence of HIV exposure. In infants however, mothers pass on their antibodies to the offspring so that actually, similar test on babies' sera may be detecting maternally transmitted i.e., passively transferred antibodies. Likewise, a negative antibody test does not necessarily assure absence of infection. At least in one or two instances of HIV-associated disease, death had occurred although no detectable antibodies were seen at six months. These might possibly be due to massive immunosuppression brought about by the AIDS virus which failed to produce detectable anti-

bodies. Alternative tests are being developed in some countries but their application in India will take a long time.

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## NATIONAL BLOOD POLICY

The former Minister of State for Health and Family Welfare told the Rajya Sabha on 3rd September, 1990, that the Government had launched a scheme for strengthening and modernisation of blood banks with the objective to augment the availability of blood and blood products, ensure safety of blood by establishing adequate testing facilities and safeguards in collection, storage and transportation of blood and promoting the rational use of blood by establishing facilities for component separation and safeguards in collection, storage and transportation of blood fractionation in a phased manner.

In a written reply to a question by Shri Padmanabham, the Minister said that the scheme envisaged augmentation of voluntary blood collection through motivation, education and publicity; establishment of testing facilities for ensuring quality of blood collected and transfused; upgrading blood banks in the Government sector in a phased manner; development of manpower and establishment of blood component separation facilities.

—P.I.B.

# NURSING CARE OF PATIENTS WITH HIV INFECTION AND AIDS

PROF. A.N. MALAVIYA, SMT. P.J. RAJLAKSHMI AND DR Y.N. SINGH

**Nursing care of the patient with infection with Human Immuno-deficiency Virus or those who have reached its terminal stage, i.e., Acquired Immuno Deficiency Syndrome (AIDS) is not different from the nursing care of patients with other diseases.**

The basic principles of nursing care of the patients with infection with Human Immunodeficiency Virus (HIV) or those who have reached its terminal stage, i.e., acquired immunodeficiency syndrome (AIDS) is not different from the nursing care of patients with other diseases. Components of basic nursing and activities of living and their relationship to nursing care especially related to and HIV infected individual has been recently addressed by Bhargava.<sup>1</sup> Thus the HIV infected patients also have the same need for: adequate respiration, nutrition, other body functions like urination and defaecation, maintenance of body temperature, adequate hydration, safe and clean environment, personal hygiene, mobility and several other psychological support including communication, entertainment, worship according to his/her faith, psychological support and advise and help in matters related to sexual activities. Finally, especially in lethal conditions, needs related to death and dying. **These basic principles of good nursing practice must be applied for providing care of HIV infected individuals.** The International Council of Nurses/World Health Organization Joint declaration on AIDS quotes the INC's code for nurses: "The nurse's responsibility is to those people who require nursing care—in providing care she/he promotes an environment in which the values, customs, and spiritual beliefs of the individuals are respected."

## Special problems of nursing in HIV infected patients

1. AIDS has been a highly publicised incurable disease. Therefore, its diagnosis has a devastating impact upon the individual, family, friends. This places a great deal of burden and emotional stress upon the nurses treating these persons.

2. There are gross misunderstandings and false beliefs related to the infective nature of the virus causing AIDS. The scientific fact is that this viral infection spread **only by sexual route and from blood-to-blood contact.** There is no evidence to suggest that

HIV can be transmitted by the respiratory or enteric routes or by casual person-to-person contact in the home or out-side. There is **NO EVIDENCE** to suggest that HIV can be transmitted through insects, food, water, toilets, swimming-pools, sweat, tears, shared eating and drinking utensils, or other items such as telephones or second-hand clothings. Yet there is extreme (and mostly unfounded) fear of contagion while providing routine ordinary nursing to such patients.

3. Because the infection is seen mostly in promiscuous individuals or in intravenous drug users, there is a stigma attached to the diagnosis of HIV infection or AIDS. This causes natural resentment against such patients. Such feeling may interfere in providing good nursing care.

4. The persons with HIV infection usually become emotionally labile because of the ostracism and isolation they face on every step. This puts extra burden on the nurses and nursing; whatever the nurses do or try to do, most of the patients do not at all feel obliged or **grateful** but try to find fault in the nurses when there is none.

5. Dedicated nurses understand that except for the symptomatic relief hardly anything else can be provided for these patients. This puts extra emotional burden on them, they feel helpless. After seeing many patients dying under their care where there is hardly anything that can be done, they soon develop a phenomenon of "emotional burn-out." This could be very serious for the nurse, her family as well as for the patient.

6. HIV infection requires special care in handling blood and body fluids of the patients. This puts extra burden on the nursing staff. They must not only themselves know all about infection control guidelines but take a leading role in teaching and

training the principles of infection control to the other members of the health care team.

7. HIV infected patients show a wide range of disease manifestations and psychological problems presenting nursing staff with numerous challenges at all stages of the disease. Nurses face challenge requiring a broad variety of professional nursing skills, including effective educational and counselling skills. This places further burden on the nurses and make them scared of looking after HIV infected persons.

8. Nurses are at the front of all the questions and anxious enquiries of the patients, relative and friends. Nurses understand that she or he cannot provide everything needed, yet she must be able to satisfy all the questioning and give up-to-date information. Thus, the nurses have an obligation to keep abreast with all the latest official, un-official, local or regional information on the subject. This becomes an added burden on the nurses.

#### **Nursing management of HIV infected patients**

The following points need special mention in the context of HIV infection and nursing:

1. Infection Control in Health-care setting.
2. Health education and counselling in relation to the HIV infection and its spread.
3. Problems of actual nursing.

A short discussion of these 3 points is given below:

#### **1. Infection control in the health-care setting**

The risk for health care worker (HCW) acquiring HIV from infected patient is remote but NOT ZERO.<sup>3</sup> Such persons include nurses, doctors, dentists, ward-orderlies, sweepers, laboratory and blood bank technicians, dialysis personnel, emergency medical technicians, hospital kitchen staff, operating room staff, mortuary staff, house-keepers, laundry workers, optometrists and all other workers whose work involves contact with patients, their blood or other body fluids or corpses. Such persons are often referred as HEALTH CARE WORKERS (HCW). The risk of infection to the HCW in their work related to HIV infected patient is very low. However, this should not justify any complacency and laxity on the part of the HCWs in observing stringent infection control measures. Importance of strict adherence to the infection control guidelines cannot be overemphasized.<sup>3</sup>

#### **THE UNIVERSAL BLOOD AND BODY FLUID PRECAUTIONS**

These precautions represent prudent practices that apply to preventing transmission of all blood-borne infections and should be used routinely.

Application of the principles of infection control is a vital part of effective day-to-day health care practice. *Adherence to guidelines for the prevention of transmission of blood-borne agents, such as hepatitis B virus (HBV) is more than sufficient for preventing HIV transmission.<sup>2</sup>*

**Precautions for health care workers the "Universal Blood and Body Fluid Precautions". If followed scrupulously. Then not only HIV But HBV and other blood-borne infections can be prevented:<sup>4</sup>**

1. All health care workers should routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patient is anticipated. Gloves should be worn for touching blood and body fluids, mucous membranes, or non-intact skin of all patients, for handling items or surfaces soiled with blood or body fluids, and for performing venepuncture and other vascular access procedures. Gloves should be changed after contact with each patient. Masks and protective eyewear or face shields should be worn during procedures that are likely to generate droplets of blood or other body fluids to prevent exposure of mucous membranes of the mouth, nose and eyes. Gowns or aprons should be worn during procedures that are likely to generate splashes of blood or other body fluids.

2. Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood or other body fluids. Hands should be washed immediately after gloves are removed.

3. All health care workers should take precautions to prevent injuries caused by needles, scalpels, and other sharp instruments or devices during procedures; when handling sharp instrument after procedures. To prevent needlestick injuries, needles should be recapped, while the cap is placed on any flat surface and not held in the other hand. This prevents accidental needle stick in the hand holding the needle cap. Also, needles should not be purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable syringes and needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal; the puncture resistant containers should be located as close practical to the use area. Large-bore reusable needle should be placed in a puncture resistant container for transport to the reprocessing area.

4. Although saliva has not been implicated in HIV transmission to minimize the need for emergency mouth-to-mouth resuscitation, mouthpieces, resuscitation bags, or other ventilation devices should be available for use in areas in which the need for resuscitation is predictable. Although HIV has been recovered from saliva, there is no conclusive evidence that saliva is involved in HIV transmission. Nevertheless, to reduce occupational exposure to HIV, mouth-pieces, resuscitation bags, or other ventilation

devices should be used if available when resuscitation is necessary. Resuscitation equipment should be used once only and discarded, or be thoroughly cleaned and disinfected.

5. Health care workers who have exudative lesions or weeping dermatitis should refrain from all direct patient care and from handling patient care equipment until the condition resolves.

6. Pregnant health care workers are not known to be at greater risk of contracting HIV infection than health care workers who are not pregnant; however, if a health care worker, develops HIV infection during pregnancy, the infant is at risk of infection resulting from perinatal transmission. Because of this risk, pregnant health care workers should be especially familiar with and strictly adhere to precautions to minimize the risk of HIV transmission.

**Implementation of universal blood and body fluid precautions for all patients eliminates the need for use of the isolation category of "Blood and Body Fluid Precautions" for patients known or suspected to be infected with blood borne pathogens.** Isolation precautions (e.g., enteric, tuberculosis) should be used as necessary if associated conditions, such as infectious diarrhoea or tuberculosis, are diagnosed or suspected.

#### The venepuncture procedure

The person performing the venepuncture as well as the person helping him, **must remain calm, cool and collected. Nothing must be done in a hurry as this leads to accidental exposures.** These persons must wear **double-gloves.** The polythene lined blotting paper with the blotting paper side up is placed below the elbow. The antecubital fossa is cleaned with spirit swab. Swab is discarded in the polythene bag lined dustbin with foot operated lid. A big dry wad of cotton is given to the patient to hold it in the other hand. Tourniquet is tied above the site chosen for the venepuncture. Then the venepuncture of the antecubital vein is made using the disposable needle and syringe. Required amount of blood is withdrawn in the syringe, then the patient is asked to put the cotton wad on top of the needle entry point and gently press. Then the needle is withdrawn. The patient is asked to flex the elbow so that the cotton wad firmly presses the venepuncture site and ensures that no leakage of blood takes place. **Soilage of linen must be avoided. Remember to remove the tourniquet before the needle is withdrawn.** The soiled cotton swab, the polythene lined blotting paper and all the other soiled items must be discarded carefully in the polythene bag lined dustbin. Any blood spill must be carefully wiped with 70% alcohol (ordinary hospital methylated spirit) or 1%

sodium hypochlorite (ordinary bleach solution "Polar" bleaching solution available in the market is 3.5% strength, it can be diluted in 2.5 volume by volume water to give 1% solution of the bleach.) Blood must be carefully and gently plunged from the syringe into the specimen vials. This is necessary to avoid the formation of aerosols from the infected blood. The screw cap must be immediately tightened. The vials with anticoagulants must be gently shaken to avoid clotting of the blood for about 30 seconds. This is not necessary for the vials without anticoagulants. **The used needle is immediately dropped inside the puncture resistant container without any attempt to re-cap or re-sheath it: Re-capping the needle is the commonest cause of accidental needle-stick injury anywhere in the world.** Used syringe can be disposed of in the foot-operated dustbin with polythene bag lining. After appropriate labelling of the specimen vials and ensuring that the biohazard labels are displayed on each vial prominently, they are placed in the big plastic containers with similar labels and biohazard labels and the lid of these plastic containers is properly closed. This is placed in the self-sealing polythene bags with the biohazard label on it. The investigation form is also placed inside the same bag. Then it is placed inside the plastic bread-box, the lid of it is secured and biohazard label on it ensured. At this stage the specimen is ready to be transported to the appropriate laboratory for conducting the tests.

The procedure for performing venepuncture at sites other than antecubital vein should follow the same basic guidelines of infection control.

Under no condition should the out-side of the specimen vials, polythene bags, the investigation forms or the plastic bread-box used for transporting the specimens be contaminated with blood and body fluids. If such a contamination occurs then it must be cleaned and disinfected with 70% alcohol. Soiled investigation forms must be discarded and new forms must be filled.

#### Transportation of the specimen

The ward sister or nurse must ensure that the specimen must not be allowed to be left around the nursing station, it must be transported to the laboratory as soon as feasible. During this period of waiting, the ward sister or nurse must ensure that the specimen containing bread-box must be kept carefully in an area where its accidental handling cannot take place. It is advisable to place it on a blotting paper sheet on which is written "DANGEROUS—DO NOT TOUCH OR REMOVE". The specimen must be carried by the ward orderly who must be told about the biohazardous nature of the specimen. He should be instructed by the nurse to ensure that it is not kept around anywhere but taken straight to the appropriate laboratory. He must also be instructed to clearly mention to the person in the laboratory who receives the sample that the specimen is biohazard-

dous and, therefore, it must immediately be taken over by a responsible person from the laboratory who knows the method of handling such specimens. The plastic bread-box must be brought back to the ward for disinfection, cleaning and re-use.

#### Handling of the other specimens

The basic procedure mentioned above can be used for collecting and transportation of the other pathological specimens also. Thus, the samples of stool, urine, sputum, tissues, body fluids can all be collected in the screw-capped vials, placed inside the big plastic container, placed inside the self-sealing polythene bags and transported inside the plastic bread-box. However, some of these specimens may not be easily contained in the small screw-capped vials. In such situations, the big plastic container with lid can itself, be used as the collecting vial. If used like this, the resident doctor or the nurse must ensure that the container lid is tightly closed and the container is kept inside an ordinary small polythene bag before it is placed inside the self-sealing polythene bag. Prominent display of the biohazard label must not be forgotten on any of the items used for placing the specimens. **Remember to follow all the precautions against Accidental Exposure; never try to re-cap or re-sheath the disposable needle. Immediately drop it inside the puncture resistant container after use and secure the lid of the container properly.**

#### Disposal of contaminated waste, garbage and rubbish

There is no epidemiologic evidence to suggest that most hospital waste is any more infective than residential waste. Moreover, there is no epidemiologic evidence that hospital waste has caused disease in the community as a result of improper disposal. Therefore, identifying wastes for which special precautions are indicated is largely a matter of judgment about the relative risk of disease transmission. The most practical approach to the management of infective waste is to identify those wastes with the potential for causing infection during handling and disposal and for which some special precautions appear prudent, such as microbiology and pathology laboratory waste, and blood specimens or blood products. While any item that has had contact with blood, exudates, or secretions may be potentially infective, it is not usually considered practical or necessary to treat all such wastes as infective.

#### Disposal of Infective Waste

There are 5 categories of hospital refuse:

(i) **Dry Refuse** (pieces of bread, fruit skin, paper, dry cotton and gauze, bandage etc.). This is not hazardous as far as the HIV infection is concerned and it can be disposed of as any other dry garbage.

(ii) **Wet (soiled) Refuse** consisting of blood soaked cotton, bandage, gauze, and any other item soiled with

blood/body fluid. This garbage is infectious and hazardous. It must be placed in a plastic bag which does not have any leakage. Proper "Biohazard" label must be placed on it and it should be sent for incineration without any further handling.

(iii) **Urine, stool, and other body fluids** which needs to be drained in the toilet or the sluice attached to the sewer line.

(iv) **Disposable needles and other sharp objects used in patient care.** These items are directly discarded in the biohazard labelled puncture proof container which must be sent to the incinerator without any further handling.

(v) **Surgically removed tissues and other body parts.** These items must be packed in biohazard labelled heavy duty plastic bags and sent directly to the incinerator.

**Reusable articles contaminated with blood or infected body fluids (CSF, pus, effusions, sexual fluids etc.)** should be washed in running cold water in a sink. Remember to use double gloves while carrying out this cleaning procedure. Visible blood clots and other solids must be scrubbed off using a brush. A fine long wire can be used to clean the inner lumen of the hollow instruments. Once the cleaning and washing has been done, the instrument as well as the wire used for cleaning are dipped in "Cidex" for 30 minutes. Then it is wrapped in a polythene bag, a label clearly mentioning "used on HIV + patient; disinfected with CIDEX" must be written on a sticking tape and placed on the outer side of the polythene wrap before being sent for reprocessing or disposal.

#### Toilet care of an AIDS/HIV Infected Patient

Each patient should have their individual bedpans and urine-pots. The bedpan and the urine-pot should be emptied into the patients toilet taking care that no splash is produced. The persons handling the bedpan and the urine-pot should wear gloves, goggles and face mask. It is not necessary to pour disinfectants into the toilet after use. The bedpan and urine-pot can be decontaminated in the following way: first, the pots must be cleaned in ordinary running water. Then they should be soaked in one per cent bleach solution. Some hospitals use autoclave machine kept separately for sterilization of the bedpan and urine-pot. Any soilage of the floor with stool or urine should be immediately covered with blotting paper sheet, paper towel or a mop and soaked with one per cent bleach solution. It should be left as such for at least 30 minutes, then cleaned in the usual way.

#### Critical Care Including Casualty and Emergency Situation, Terminal Care

If appropriate precautions are taken to prevent exposure to blood or other body fluids in the casualty and emergency setting then the risk of transmission

of HIV infection cannot be higher than for HCWs providing care in the in-patient wards.

Resuscitation measures are frequently needed in emergency areas. Therefore, proper resuscitation equipments including incubation tubes, Ambu bag and other items must always be kept handy so that mouth-to-mouth resuscitation is not required in these situations. After use, the equipments can be disinfected and sterilized according to the standard procedures for the sterilization of HIV contaminated articles.

**Mouth-to-mouth resuscitation.** Although HIV has been recovered from saliva, there is no conclusive evidence that saliva is involved in HIV transmission. Nevertheless, to reduce occupational exposure to HIV, mouthpieces, resuscitation bags, or other ventilation devices should be used if available when resuscitation is necessary. Resuscitation equipment should be used once only and discarded, or be thoroughly cleansed and disinfected. A suction apparatus in working condition should be readily available in the emergency area.

#### **Death Related Procedures**

After the death of the patient the I.V. line, the other tubes etc. must be removed from the body with the usual blood and body fluid precautions. Gloves must be worn during this procedure. If the splashes of body fluids are expected, then the disposable plastic apron and goggles must be used. All the tubings, IV lines etc. must be disposed according to the procedures described earlier. All the open wounds, incision sites and other raw, open areas must be covered with sticking plaster. Biohazard label must be put on the body. The body must be properly packed with cotton plugs in the nostrils, ears, anus (and vagina in the females) and inside the mouth. **Recently a committee of the Director General of Health Services, Govt. of India has recommended that all the dead bodies must be wrapped in heavy duty plastic if the person has died of any hazardous infectious disease irrespective of the fact whether any autopsy etc. has been done or not. Biohazard label may be pasted on the outside of the wrapping sheet.**

#### **Instructions to the next-of-kin or the legal heir regarding the handling of the dead body before cremation**

The next-of-kin must be told that any rituals involving situations where the dead body's fluids or blood

can come in contact with the persons handling the body must be completely avoided.

#### **H. Disinfection of the Bed/Room Cubicle/Laboratory Bench/Mortuary Table**

Environmental surfaces such as wells, floors, and other surfaces are not associated with transmission of infections to patients or health care workers. Therefore, extraordinary attempts to disinfect or sterilize these environmental surfaces are not necessary. However, cleaning and the removal of solid waste should be done routinely.

Cleaning schedules and methods vary according to the area of the hospital or institution, type of surface to be cleaned, and the amount and type of refuse present. Horizontal surfaces (e.g. bedside tables and hard surfaced flooring) in patient care areas are usually cleaned on a regular basis, when soiling or spills occur, and when a patient is discharged. Cleaning of walls, blinds and curtains is recommended only if they are visibly soiled. **Disinfectant fogging ("fumigation") is an unsatisfactory method of decontaminating the room of the HIV infected person.** Therefore, this practice must not be used in relation to HIV infection.

Disinfectant-detergent formulations can be used for cleaning environmental surfaces, but the actual physical removal of organic material (micro-organism) and mucous membrane contact with blood and other body fluids of all patients. Gloves and surgical masks must be worn for all invasive procedures. Protective eyewear (goggles) or face shields should be worn for procedures that commonly result in the generation of droplets, splashing of blood or other body fluids, or the generation of bone chips. Gowns or aprons made of material that provide an effective barrier should be worn during invasive procedures that are likely to result in the splashing of blood or other body fluids. All health care workers who perform or assist in vaginal or caesarean deliveries should wear gloves and gowns while handling the placenta or the infant until blood and amniotic fluid have been removed from the infant's skin and should wear gloves during delivery of the umbilical cord.

If a glove is torn or a needlestick or other injury occurs, the glove should be removed and new glove used as promptly as patient safety permits; the needle or instrument involved in the incident should also be removed from the sterile field.

## 2. Health education and counselling in relation to the HIV infection and its spread

Counselling is a process in which people interact in such a way so that it helps them to deal with their problems with better understanding. Counselling dispels a lot of irrational fears and misunderstandings associated with the disease. It can help provide support at times of crises. Most importantly it can improve and reinforce motivation to change behaviour. Counselling as a service should ensure the dissemination of correct and consistent information on AIDS.

### Counselling for WHOM ?

The first question regarding counselling is "who needs counselling?" In the context of AIDS, counselling is required for:

- (1) Persons belonging to the "at risk" groups for AIDS but not yet infected.
- (2) Persons who are already infected but are yet to develop the clinical disease.
- (3) The relatives and acquaintances of the persons who are infected and have advanced clinical disease.

Various prospective studies have shown the efficacy of counselling in preventing the spread of the infection among the high risk groups by motivating them, particularly the promiscuous segment; to practice safe sex practices and bringing about a change in life-style. Similarly an intravenous drug addict should be convinced about the hazards of addiction and the risk of spread of blood borne infection, including AIDS, especially by needle sharing. Attempts should be made to wean them off drug addiction or failing which, to at least persuade them use sterile needles. The other group that require preventive counselling are the blood donors. Donors who have a promiscuous life-style and thus are "at risk" should be strongly discouraged to donate blood.

The last group that requires very intensive counselling are those who receive frequent blood or blood component transfusion. They should be discouraged from buying blood from private blood banks being supplied by professional donors but to try and get it from friends and relatives as far as possible. Those requiring blood products like Anti-Haemophilic factor should ensure that manufacturers have taken adequate precautions to eliminate the risk of HIV infection.

Asymptomatic but HIV infected patients comprise another major group who need counselling. This group is particularly important because it is their personal habits which are squarely responsible for sustaining the epidemic in the world. Mathematical models as well as studies in special population groups have clearly shown that if counselling is effective in bringing about a behavioural change in this group the spread of AIDS can be checked. Their families and close friends may also be included in the counselling programme so that they can reinforce the motivation to change their behaviour.

The emotional trauma suffered by the near and dear ones of a patient with advanced AIDS is severe. Experienced counsellors can help to alleviate their suffering to a great extent.

### 3. Problems of actual nursing of HIV infected patients

At a first glance it would appear that nursing of patients with HIV infection will be very difficult. This is because they have wide range of disease manifestations requiring a broad variety of professional nursing skills. But, if one looks into the details of the nursing needs of such patients and categorises each need into components of nursing,<sup>1</sup> then it becomes clear that **"the variety of problems experienced by a person with AIDS will be familiar to the nurse and management is not different from that for patients with other similar signs and symptoms."**

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# TEN POINTS ON AIDS FOR WORLD AIDS DAY

## 1. **Aids is a new worldwide problem.**

Over 150,000 cases of AIDS have been reported from more than 145 countries around the world. All communities can be affected by AIDS because the human immunodeficiency virus, HIV, that can cause AIDS can cross all boundaries, geographical and social. Worldwide, an estimated 5 to 10 million people are already infected with HIV.

## 2. **We know how HIV spreads.**

Fortunately, HIV can only be spread in three ways:

- \* sexual intercourse
- \* blood
- \* from infected mother-to-infant.

## 3. **To know how HIV spreads is to know how to prevent infection.**

HIV can be spread by sexual intercourse—from man to woman, from woman to man and from man to man. HIV can also be spread through blood in two major ways: by receiving a transfusion of contaminated blood; or if needless or other skin piercing instruments are used more than once without being properly cleaned and sterilized after each use. Finally, HIV can spread from infected mothers to their infants, either before, during, or after birth.

## 4. **The sexual spread of HIV can be prevented.**

The most effective means of preventing the sexual spread of HIV is by remaining with a faithful, uninfected partner or not having sexual intercourse at all. Otherwise, a person should reduce their number of sexual partners as much as possible. People should avoid sexual intercourse with prostitutes or other people who have many sexual partners. Whenever having sexual intercourse with someone who might possibly be infected with HIV, a condom should be used—properly—from start to finish.

## 5. **Infection through blood can be stopped in a variety of ways.**

Fortunately, blood for transfusion can be tested for infection with HIV and discarded if contaminated. Needles and other skin-piercing instruments can be

sterilized after each use. Drug users can—and should—stop injecting drugs; if they continue, they should use only sterile needles and not share them with anyone.

## 6. **It is important to know how HIV is NOT spread.**

HIV is NOT spread by casual contact at work or school, shaking hands, touching or hugging. It is NOT spread through food or water, by sharing cups or glasses, by sneezing or coughing, by insects, in swimming pools or on toilets. Knowing how HIV is NOT spread helps people understand that there is no danger of becoming infected from casual contact.

## 7. **AIDS affects us all.**

There is no reason to fear people who are HIV-infected or have AIDS. They should not be discriminated against. They need our support to help them with the physical and emotional difficulties they face.

## 8. **Information and education are vital.**

Some day, medical research may give us a drug to cure AIDS or a vaccine to prevent AIDS. Until then, we must rely on changes in personal behaviour to prevent the spread of HIV. Information and education are therefore vital in the fight against AIDS.

## 9. **A global mobilization for a global threat.**

National AIDS programmes already exist in nearly all countries of the world. These programmes inform and educate people about AIDS, how to avoid becoming infected and how to protect others. National AIDS programmes are linked through the Global Programme on AIDS of the World Health Organization, which directs and coordinates the Global AIDS Strategy. Because AIDS is a global problem, it can only be stopped in one country if it is stopped in all countries.

## 10. **Together, we can stop AIDS.**

You can contribute to stopping AIDS, by making sure that you understand the facts about AIDS and helping others to do the same. The risk of AIDS is not about **who** you are or where you are. It is about **what** you do. We now have the opportunity to talk about AIDS, to learn, to teach and to speak out. Join the worldwide effort to stop AIDS.

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## AIDS

**A worldwide effort will stop it**

# MONITORING OF NATIONAL AIDS PREVENTION AND CONTROL PROGRAMME

DR SHIV LAL

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The monitoring process at the Central level shows that there is a high level of involvement both at the political level as well as technical/administrative echelons which will make the control of HIV infection in the country a possibility.

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THE sudden emergence of Acquired Immuno Deficiency Syndrome (AIDS) and infection with Human Immunodeficiency Virus (HIV) as a major public health problem has placed a considerable burden on the already hard-pressed health system managers in the country. The national programme on control of AIDS required the development of a medium term plan, including strategies, programmes and a detailed plan of action, then the application of methods to ensure that the plan is implemented. The complexity of AIDS Control Programme makes it a challenge to managerial skills. The burden should not fall on one individual or a single central body. To be effective, a decentralized system suited to the country and its infrastructure should be devised and authority should be given to provincial/State Governments to seek and apply solution to problems within their sphere of competence.

## Monitoring

The continuous follow-up of activities to ensure that they are proceeding according to plan is known as monitoring. Monitoring keeps track of activities and achievements, staff movements and utilisation of services, supplies and equipments including resource mobilisation, so that if anything goes wrong immediate corrective measures can be taken.

## Role of Monitoring

The global strategy for the prevention and control of AIDS aims at the development of a strong, comprehensive national AIDS prevention and control programme in every country. The steps to be followed in developing such a programme are :—

- (a) carry out an initial assessment of the epidemiological situation and the resource available;
- (b) devise a short-term plan (one year) to initiate the action needed to meet the most pressing needs;
- (c) draw up a medium term plan (3-5) years, establishing the objectives, strategies, targets and activities best suited to the individual country. The medium term plan (MTP) should specify what activities will be carried out, where and when, at what cost, and who is responsible.

## Principles of Monitoring

Every management control system has to consider four basic elements :

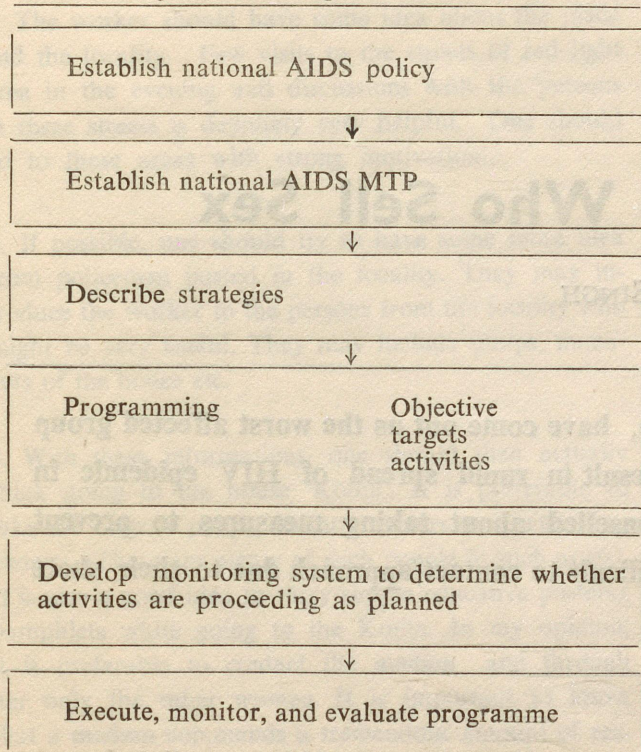
1. Factors to be monitored (personnel, money, materials, etc.).
2. How the monitoring data are to be presented (bar charts, accounts, etc.)
3. Standards applied to the factor (amounts to be distributed, target dates for completion, budgetary lines for specific expenditures, such as salaries and transport costs).
4. Comparison of what actually occurs with the standards (changes in implementation will be based on the result of this comparison).

## Flow Chart for National AIDS Control Programme

Programme management and flow chart for National AIDS Control Programme which can be involved under the National AIDS Control Programme for

implementing and monitoring the programme in India are as follows :—

#### Programme Management Flow Chart



#### Prevention and Control of AIDS in India

As there is no vaccine or effective treatment, strategies for control of AIDS rests entirely on prevention of the HIV transmission.

The national AIDS prevention and control programme of India is based on the following strategies :—

1. Prevention of sexual transmission.
2. Prevention of transmission through blood and blood products.
3. Prevention of transmission by injection and skin piercing practices.
4. Prevention of perinatal transmission.
5. Reduction of the impact and management of AIDS/HIV infection.

#### Epidemiological Situation

As on 31 October, 1990 through a network of 46 Surveillance Centres working in Microbiology Department of various Medical Colleges including 4 Referral Centres namely Christian Medical College, Vellore, National Institute of Virology, Pune, All-India Institute

of Medical Sciences, New Delhi and National Institute of Communicable Diseases, Delhi, about 5.8 lakh people belonging to high risk groups namely; prostitutes, patients attending STD clinics, blood donors, recipients of blood and blood products and foreigners have been screened.

#### Monitoring under National AIDS Control Programme

Three agencies have been included for monitoring under the National AIDS Control Programme in India :—

1. Directorate General of Health Services.
2. Indian Council of Medical Research.
3. State Health Directorates.

The Directorate General of Health Services (DGHS) is coordinating the programme in collaboration with I.C.M.R. and State Governments at the National level and regular rapport is being maintained with the surveillance centres which are functioning in different parts of the country. The centres are being requested to send their requirement for kits to be used for screening of HIV infection on monthly basis. The State Governments are also being requested to send their fortnightly report in the proforma which included the number of samples to be screened, number of samples found seropositive, age and category-wise break-up of high risk groups and number of the kits are in stock.

The DGHS in collaboration with I.C.M.R. and State, Governments have identified 12 Medical Colleges in the country for establishing the AIDS unit for clinical management of HIV infected person and AIDS cases. The proforma has been devised to send the details of the cases who are clinically positive.

After receiving the report from the Surveillance Centres, and AIDS unit from different parts of the country the I.C.M.R. headquarters is compiling the reports and the same reports are being sent to the DGHS which, in turn, through Ministry of Health, Government of India is regularly informing the Prime Minister's Office in a specially devised proforma on monthly basis.

The above monitoring process shows that there is high level of involvement both at the political as well as technical/administrative echelons which will make the control of the HIV infection in the country a possibility. ○

## Reaching Women Who Sell Sex

DR Y.N. SINGH

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**Women who sell sex, either willingly or otherwise, have come out as the worst affected group so far as HIV infection is concerned. This will result in rapid spread of HIV epidemic in India. The prostitutes, therefore, need, to be counselled about taking measures to prevent themselves and their clients who are often very difficult to contact/approach due to their short association with the prostitutes.**

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There is no doubt now that human immunodeficiency virus (HIV) infection has firmly established its roots in India. The worst victims are commercial sex workers (particularly prostitutes), patients with sexually transmitted diseases, paid blood donors and recipients of multiple transfusions of blood/blood products. Excluding the last named group, all other groups have one thing in common i.e., heterosexual promiscuity. Thus it is very clear that heterosexually promiscuous behaviour is one of the most important factors responsible for HIV infection in our country.

Women who sell sex, either willingly or otherwise, have come out as the worst affected group so far as HIV infection is concerned. This is proved by the national data on HIV serosurveillance which shows that women engaged in commercial sex in many cities have more than 10% seropositivity (i.e. persons with HIV infection). Due to poor condom use, not only they are at risk of getting HIV from their clients but also they can actually spread this infection to the clients. This will ultimately result in rapid spread of HIV epidemic in India. With this, it becomes very obvious that something must be done to prevent this

spread and prostitutes should be counselled about condom use to prevent themselves and their clients who are often very difficult to contact/approach due to their short association with the prostitutes.

To some, it may appear very difficult to approach prostitutes. I have even heard some of the 'big-workers' saying that due to illegal nature of the profession (?), it is very difficult to locate prostitutes. To a sincere worker, it is really not difficult to locate the area or to find out these women. In almost every city, there is some area called red light area and any worker can go and approach them. Approaching and convincing them may be difficult in the beginning because they may not take the worker seriously. This is natural because these women have been deceived by many persons who have thrown them there. Persistence, sincerity and regularity, however, will definitely help the workers in their efforts.

### **Working with the Prostitutes**

While working with the prostitutes in North Indian cities, I have gained some experience which, I feel,

can be of use to other workers in this field. I divide this experience into following:

1. The worker should have some idea about the place and the locality. Few visits to the streets of red light area in the evening and discussions with the persons in these streets is definitely very helpful. One should go to these areas with strong motivation.

2. If possible, one should try to have some more idea from policemen posted in the locality. They may introduce the worker to the persons from the locality who might be very useful. They may include pimps, managers of the house etc.

3. With these informations, one should then actually think going to the house 'Kotha'. It is preferable to take the help of pimps, teashop owners and betel shop owners. (There are plenty of such people in such areas). It is also a good idea to carry simple educative posters/pamphlets while going to the Kotha. In my opinion, it is preferable to contact the **madam** and through her only the other women. It is important to know that a **madam** commands a tremendous amount of respect from these prostitutes. Once she agrees, then, the worker can speak to prostitutes as a group followed by pamphlets distribution.

4. The message to be delivered in these meetings should include 'What is AIDS?' 'Has it come to India?' 'How does it spread?' 'Why prostitutes are at risk?' and 'How to prevent it?' in simple language which they easily understand.

5. The worker should pay regular and periodic visits to reinforce the message. Madams and pimps can help a great deal in this by helping the worker in re-emphasizing the message among the prostitutes.

6. Small video films on AIDS/Condom-use, if available in their language, is really very helpful. It is more effective if this video film has participation from the prostitutes themselves. Some houses have even VCR and many have televisions. With little difficulty, these video films can be shown to them.

7. One other effective method for initiating a thinking on condom-use is to distribute condoms. These occasions give beautiful opportunity to impress upon them the need/importance of condom-use for HIV-prevention.

8. If a worker is sincere and he/she is regular in her visits, he/she can easily make a team of workers from these areas. The team can include pimps, tea-shop and betel-shop servants. This team can be very effective in spreading the message.

9. All of the above discussion centered around prostitutes of red light area and there was no discussion about 'call-girls' who are very-very difficult to be reached. This is obvious due to the fact that many of these so called 'call-girls' are from supposedly high social classes of the society and therefore not willing to have any chance of breach of confidentiality. To reach them, one has to go through the managers/owners of hotels, guest houses etc. but how far this will be successful, is difficult to judge. Very interestingly, many of the prostitutes from the red light area do work as 'call-girls' and for them, counselling at Kothas will be adequate.

If a worker follows the above-mentioned points, then he/she may easily approach these women and can succeed in his/her goals. At the same time, it is important to mention that there could be occasions when he/she may face awkward and unpleasant situations but he/she should not lose heart. Sincerity and regularity will ultimately win their (prostitutes) confidences and the mission will be successful.

**HAVE YOU RENEWED YOUR SUBSCRIPTION ?**

*If not, do it now.* Please send it to:

**The Director,  
Central Health Education Bureau,  
Kotla Marg, New Delhi- 110002.**

# FREEDOM FROM AIDS

## —A Human Concern

AIDS concerns you and me and everybody else. Imagine this scenario—There is a small girl child who dies before her fourth birthday—because her father, a drug addict, became infected with Human Immuno-deficiency Virus (HIV) while injecting himself with drugs using a contaminated needle and syringe—he passed the infection to his wife through sexual intercourse—the child was born infected with AIDS from her mother. Intravenous drug abuse, unsafe sex and perinatal transmission, thus formed into deadly chain nipping this young life in the bud before it could blossom.

We, in India, have luckily not had a single case of child with AIDS so far. Let us take action NOW to maintain this status — (1) by using condom during sexual intercourse and restricting the number of sexual partners, (2) by shunning drug abuse through injection and avoiding the use of contaminated needles, and (3) ensuring that blood for transfusion is free from HIV.

**SEXUAL PRACTICES**—The more the number of sexual partners the greater is the probability of having sex with an infected person. Intercourse without a condom and which causes fears or bleeding is most likely to transit HIV. The term 'safer sex' covers these sexual practices that reduce the risk of passing HIV from one person to another by semen or vaginal fluids or blood which can carry HIV and should never be allowed to enter the vagina, mouth or anus or to touch the skin where there is an open cut or sore. Safer sex practices include:

- (1) Use of a condom for all types of intercourse.
- (2) A mutually faithful relationship between two uninfected partners.
- (3) Reduction in the number of sexual partners
- (4) Avoiding sex with partners who have open sores or sexually transmitted diseases (STDs).

Among women, prostitutes are at high risk of AIDS because they have many sexual partners and may be suffering from STDs. There is need to educate them :

- to use condoms with all partners every time they have sex,

- to get STDs treated immediately and properly,
- to avoid sex with partners who have open sores as this increases the risk of AIDS transmission,
- not to have sex if they have open sores.

**PREGNANCY** : Women with high level of HIV are more likely to transmit the virus to their babies. Some studies have shown that one third to one half of the babies born to HIV infected mothers are themselves infected. During pregnancy, the virus could cross the placenta and enter the blood circulation of the foetus. The infection may also be transmitted during child birth when the baby comes into contact with secretions from mother's cervix and the mother's blood. There is also a rare possibility that the babies may become infected through their mother's milk.

**INJECTIONS AND TRANSFUSIONS**—When needles and syringes not adequately sterilized are used again, contaminated blood can pass from one person to another. In those drug abusers who share infection equipment, this could be a route for spread of injection. We should urge such intra-venous drug abusers to stop such abuse, failing which atleast to stop sharing needles. They should also use condoms with all their sexual partners.

The virus could also spread through use of HIV contaminated blood for transmission purposes. Though the donated blood should be tested for HIV anti-bodies, such screening may not detect all contaminated blood as the anti-bodies may not develop for two weeks to six months after infection with HIV. Hence, it is important that we should discourage those who have high risk practices (like intravenous drug abuse/multiple sex partners/going to prostitutes) from donating blood.

**“BY SAYING ‘NO’ TO UNSAFE OR UNWANTED SEX OR DRUGS YOU WOULD BE SAYING ‘YES’ FOR FREEDOM FROM AIDS”**

—Dr S. Venkatesh

# IMMUNE SYSTEM IN HUMANS AND ITS FUNCTIONS

DR S. KUMARI AND DR D. CHATTOPADHYA

**M**AN faces an array of infectious agents around him daily. The mechanism of protection against these agents is termed immunity. Each human being is endowed with a quota of immunity which can be divided into (1) Natural immunity and (2) Acquired immunity.

## Natural Immunity

This depends on the make up of the host tissues and body fluids and is independent of any prior contact with foreign agents such as bacteria and viruses. Examples are surface barriers of skin, mucous membrane, cilia and secretions on surface like long chain fatty acid or in tissue fluids like lysozyme.

## Acquired Immunity

This form of immunity depends on contact between the cells of the hosts immune system and foreign agents called antigens—these may be micro-organisms or their products or substances that are not components of the hosts own tissue.

There are two major categories of acquired immunity namely humoral immunity and cellular immunity both of which are essential components of defence against pathogenic micro-organisms.

### (a) Humoral immunity:

Humoral immunity is mediated by serum gamma-globulins called antibodies or immunoglobulins. Immunoglobulins are synthesized by a class of white blood cells called B lymphocytes. These cells originate from stem cells in the bone marrow and the antibodies (immu-

noglobulins) they secrete are found throughout the blood and in many body secretions. Each antibody immunoglobulin is specific for the foreign antigen that induced its formation.

### (b) Cellular immunity:

Cellular immunity is mediated by another class of lymphocytes called T lymphocytes and a class of phagocytic cell called macrophages (or monocytes). T lymphocytes like B lymphocytes originate from bone marrow stem cells but differentiate in the thymus gland before migrating to the peripheral tissues.

## TISSUES AND CELLS OF THE IMMUNE SYSTEM

### 1. Tissues

#### (i) Primary lymphoid tissue:

(a) Bone marrow in which cells of immune system arise from stem cells.

(b) Fetal liver makes an important contribution to the origin of B lymphocytes.

(c) Thymus gland in which T lymphocytes derived from bone marrow stem cells migrate and differentiate. Here they gain their main functional activities.

#### (ii) Secondary lymphoid tissue:

(a) Lymph glands where differentiated T and B lymphocytes migrate and occupy distinct sites in the organ, paracortex and cortex respectively. Macrophages and dendritic cells are present to trap antigens entering the glands during the passage of the lymph from afferent to efferent lymphatics.

(b) Spleen, where T and B lymphocytes are present in the white pulp around the central arteriole.

(c) Blood and lymph, where B and T lymphocyte circulate passing continuously in and out of the system and through the lymphoid organs. This is called lymphocyte recirculation.

(d) Collection of lymphoid cells found in various organs specially associated with the mucous membranes of respiratory and gastrointestinal tract, e.g., tonsils and Peyer's patches.

## 2. Cells of the Immune System

The main cells of the immune system are macrophages, T lymphocytes of various subclasses and B lymphocytes. Polymorphonuclear leucocytes are involved in non-specific immunity, eosinophils are involved in immunity to heminths and basophils release histamine and other mediators in allergic reactions.

### 1. Macrophages:

These cells are derived from the bone marrow stem cells. They play an important role by phagocytosing micro-organisms, then digesting them and presenting to the antigenic components of the micro-organisms in a processed manner to the lymphocytes for induction of immunity. A wide range of membrane receptors enable macrophages to recognise foreign antigens, antigens coated with antibody and serum complement components. Specific receptors of the major histo-

compatibility complexes (HCC) combine with the antigen and the complex is recognised by helper T lymphocytes. This leads to triggering of immune response. Macrophages also produce mediator (Monokines) that influence T-lymphocytes. Macrophages play an important role in the immunity against tubercle bacilli, protozoa and some viruses due to its power of intracellular killing through superoxide release. Acting in conjunction with antibodies macrophages can kill infected cells and tumour cells. This activity is called Antibody Dependent Cell mediated Cytotoxicity.

#### 2. T-lymphocytes:

These cells are derived from bone marrow stem cells and differentiated within the thymus gland. Two subclasses of T lymphocytes have been known to take part in the regulation of immune response. One variety known as T-helper lymphocyte recognise antigen by means of T cell receptor in association with macrophage receptors and then stimulate other T lymphocytes that take part in immunity, and B lymphocytes leading to antigen specific antibody production. T lymphocytes are involved in a variety of cellular immune reactions including contact sensitivity in the skin to simple chemicals like DNCB, delayed hypersensitivity reactions to certain types of antigen, e.g., tuberculin. T lymphocyte activity can be assessed by testing their ability to proliferate in the presence of certain extracts of plants called mitogens, e.g., Phytohaemagglutinin. T lymphocytes produce a variety of mediators called lymphokins that can activate macrophages and other T lymphocytes.

#### 3. B lymphocytes:

These cells are derived from bone marrow stem cells. B lymphocytes

recognise antigen by means of antibody molecules on its cell membrane that act as receptors. One B-cell can make antibody of only one specificity. The mature B-cell is not an antibody secreting cell but can readily differentiate on antigenic stimulation to the plasma cell that synthesizes and secretes antibody. Stimulation of B-cells normally requires cooperation of T-cells. Certain antigens, however, are able to stimulate B cells directly, e.g., bacterial lipopolysaccharides which are known as T independent antigens.

#### 4. Natural Killer (NK) cells:

These are less defined cells of lymphoid series other than T and B-cells. They are actively involved in direct killing of the infected cell or tumour and thus are extremely helpful in cellular immune defence mechanism.

### Immunity in bacterial infections

#### (a) Antibody mediated immunity:

Some microorganisms acquire their pathogenic abilities through the production of exotoxins. Amongst diseases dependent on this type of mechanism are diphtheria, tetanus and gas gangrene. Antibodies either acquired by immunisation or previous infection or given passively as antiserum are able to neutralise these bacterial toxins. Where a microorganism does not secrete exotoxins, the protection afforded by antibodies depends on the direct effect of antibodies attached to the surface of the microorganism. The important effect of this attachment is to encourage phagocytosis by blood macrophages or polymorphs. The phagocytic cell then can digest the microorganisms by a variety of digestive enzymes.

#### (b) Cellular immunity:

This type of immunity has limited utility in bacterial infections compared to other types of infection, e.g., viral or protozoal.

Intra-cellular bacteria that live within macrophages e.g., tubercle bacilli, brucellae, listeria can be effectively killed if the macrophages are activated by lymphokine produced by lymphocytes.

### Immunity in viral infection

#### Humoral immunity:

In viral infections the efficacy of antibody depends largely on whether the virus passes through blood stream in order to reach its target organ. Some viruses do so for example polio virus in which antibody in the blood can effectively neutralise the virus. In another group of viral diseases, the target organ of the infecting virus is the site of entry to the body, e.g., respiratory mucous membrane for influenza virus. For this type of infection antibody must pass through the mucous membrane into the respiratory secretion.

Apart from the direct defence offered by humoral immunity, it also functions in cooperation with cellular immunity. For sample, antibodies that bind to viral antigens expressed on infected cells can lead to activation of macrophage and other killer cells leading to the killing of the virus infected cells.

#### Cellular immunity:

This form of immunity is the main mechanism for recovery from viral infections. Cytotoxic T lymphocytes recognise viral antigens on the surface of an infected cells in association with Class I HMC antigen. This leads to lysis of the infected cell. Natural killer cells (NK) are activated by interferon from macrophages and kill the virus infected cells. The T lymphocytes that mediate delayed hypersensitivity, probably help in the early stages of a viral infection by attracting macrophages and other T cells to the site of infection.

(Contd. on page 308)

# THE SEARCH FOR A VACCINE

## —New Optimism

PHYLLIDA BROWN

A vaccine will be ready by the end of the century. This confident prediction, made by leading scientists at the Sixth International Conference on AIDS in San Francisco this summer, is part of a new optimism surrounding research into HIV. But the optimism is tempered by knowledge of the global crisis that the virus has already set in motion: by the time we have the vaccine, at least 20 million people worldwide will be infected, according to the World Health Organization.

While the researchers' strategies against the virus become more and more sophisticated, the majority of the world's peoples continue to face the prospect of a growing epidemic without the resources to cope.

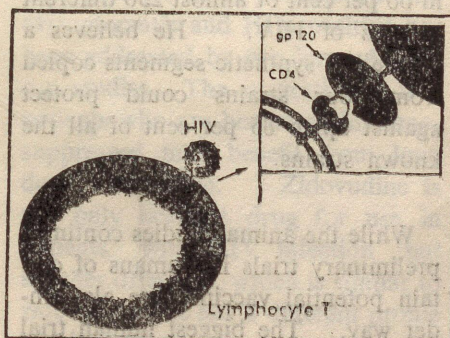
"For those of us living in the parts of the world where health, hygiene, basic facilities and the tools for communicating ideas are less established, the impact of AIDS is awesome," said Eunice Kiereini, chair of the WHO's Regional Nursing and Midwifery Task Force in a speech to the conference delegates. She described an African woman who can afford soap but not the disinfectant she knows she needs to care for her husband, who has AIDS, and their children. Talk of a genetically engineered vaccine may seem academic to countries whose annual health budget is under \$10 a head.

Nevertheless, genuine progress has been made. This year, researchers have demonstrated clearly that it is

possible to arm the immune system against the very group of viruses that attack it. Until now, many researchers had thought such a prospect unlikely.

The immune-deficiency viruses include those that infect humans—HIV-1 and HIV-2—and the simian immune deficiency viruses (SIVs,) which have been isolated from certain species of monkey over the past five years. HIV-1 is the cause of most of the world's cases of AIDS; HIV-2 is found mainly in parts of West and Central Africa, but it is also prevalent elsewhere; in Portugal, for example, 12 per cent of all those currently infected have HIV-2.

One problem with protecting the body against HIV is that it attacks precisely the cells of the immune system that would normally fight an invader: the lymphocytes known as T cells, and macrophages. In addition, the virus mutates rapidly. An infected individual may have several different strains in different



HIV attaches itself to the target lymphocyte cell by recognising a small part of the protein (CD<sub>4</sub>) on its surface.

tissues, and one strain may mutate over time in that individual.

Some researchers are trying to determine the precise mutations that make the virus turn virulent. For months or years, HIV can lie inactive in cells, then it suddenly starts to proliferate and attack its host. At the University of California, San Francisco, Cecilia Cheng-Mayer has compared virus taken from an infected man when he was still healthy with virus taken when he was becoming ill. A small mutation in the gene that codes for HIV's protein coat, made the virus reproduce more rapidly and infect more types of cells. If further studies confirm this work, scientists could target the site of the mutation for future therapies against the virus.

But the biggest excitement surrounded vaccines. Michael Murphy-Corb at the Delta Regional Primate Centre in New Orleans, pronounced herself confident that a vaccine would be ready by 2000. She is working with rhesus monkeys, which offer a helpful "model" of AIDS in humans. Once infected with SIV, the monkeys develop symptoms of immune deficiency that parallel human AIDS. It takes only months, rather than years, to evaluate potential vaccines in these animals.

Murphy-Corb vaccinated the monkeys with whole, inactivated SIV, "flagged" with a substance known as an adjuvant which helps the immune system to recognize the viral material. The monkeys were

then challenged with live SIV directly into the bloodstream. Six months later, eight out of nine immunized animals had no sign of the virus, and the one that tested positive for virus was nevertheless free of any symptoms of disease. Unvaccinated animals all developed the disease. Similar experiments at two other primate research centres in the United States were also reported.

There are several drawbacks, however. First, a whole-virus vaccine may not be a suitable approach for protecting humans. Most researchers fear that, even inactivated a whole virus could mutate and become pathogenic in its human host. Secondly, we know only that Murphy-Corb's vaccine protects the monkeys against virus injected directly into the blood. In reality, humans are often infected through the mucous membranes of the vagina and rectum.

Jay Berzofsky, from the National Cancer Institute in Bethesda, Maryland, believes that a synthetic vaccine using only a part of the virus will be preferable to a whole-virus one, even if it takes longer to develop. Many groups are pursuing such genetically engineered vaccines. One approach is to insert genes from HIV into the harmless vaccinia virus, the basis of traditional smallpox vaccine. The recombinant virus then expresses proteins from HIV on its coat, which in theory stimulate the body to produce antibodies. Another approach is to make synthetic copies of the proteins from HIV and attach them to adjuvants.

Using the second of these approaches, a team from the Californian company Genentech and the Southwest Foundation for Biomedical Research in Texas has immunized two chimpanzees against HIV. Last

year, the team inoculated the animals with a synthetic protein mimicking the protein known as gp 120 from HIV's outer coat. The animals responded by producing large numbers of antibodies that could neutralize HIV in the test tube. More than seven months after challenge with live HIV into the bloodstream, the two animals remained free of infection, the team told the conference.

Most researchers now agree that a particular part of the protein gp 120 is the virus's "Achilles heel". This is a small loop known as V3. If antibodies bind to V3, the virus seems to be unable to insert its own genetic material into the body's cells. If we can block V3, in other words, we may be able to block infection.

But the snag with V3 is that it is so variable. V3 from one strain of virus will be different from that of another. So even if scientists can use it to trigger the production of specific antibodies in humans, it is not certain that they would be protected. Nevertheless, a combination of synthetic copies of V3 from several strains might provide protection, according to Scott Putney of the company Repligen in Massachusetts. He and his colleagues at the company Merck have found a segment of V3 that is unchanged in 60 per cent of almost 250 different isolates of HIV. He believes a cocktail of synthetic segments copied from four strains could protect against up to 85 per cent of all the known strains.

While the animal studies continue, preliminary trials in humans of certain potential vaccines are also under way. The biggest human trial is a multi-centre study in the United States using a preparation called VaxSyn HIV-1, made by a company called MicroGeneSys in Connecticut. This vaccine, which has

been given to more than 200 HIV-negative volunteers so far, is also based on synthetic copies of the protein coat of HIV. One of the centres, Johns Hopkins University in Baltimore, has had surprising and encouraging results, according to its leading scientist, Robert Siliciano.

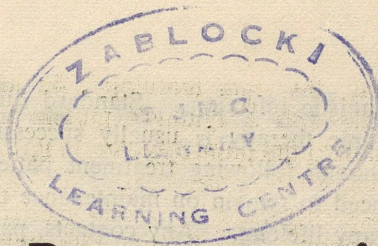
For the first time, Siliciano's team has shown that a synthetic vaccine can stimulate the production not only of antibodies, but also of the immune system's "killer" T cells. These killer cells, cultured from the blood of vaccinated volunteers, attacked several different strains of HIV in the test tube.

The immune system has two "arms": antibodies, and cells such as T-helper cells and killer T cells. Most vaccine researchers have aimed only at making the body produce antibodies. But many teams are now beginning to believe that to be fully protective a vaccine should stimulate T cells as well.

Other researchers are working on vaccines intended for people who are already infected, rather than as a protection against infection. In Britain, the Medical Research Council and a company in Oxford called British Biotechnology have begun trials in London on HIV-negative volunteers with a vaccine based on tiny particles, produced by genetically engineered yeast cells, which resemble viruses and carry viral proteins on their surface. And recent work suggests that it might be possible to protect the unborn children of HIV-positive women from becoming infected by vaccinating the women during pregnancy.

Despite the optimism, we still have a decade or so to wait. And in the meantime the best vaccine will continue to be prevention.  $\Delta$

(Courtesy: AIDS Watch—12, 1990)



# TREATMENTS—Progress with opportunistic infections

SARAH GILL

**D**ESPITE the absence, now and in the foreseeable future, of a cure, we have come a long way in managing patients with AIDS and HIV infection since the first cases were reported in the early 1980s.

For most people for whom HIV disease has been fatal, it has been one of the so-called opportunistic infections that has been responsible for the death. Treating these infections, which catch hold because the immune system is damaged as a result of the HI virus, can help to prolong patients' lives.

For example, *Pneumocystis carinii* pneumonia is a common infection amongst people with HIV in developed countries but the fatality rate has changed enormously since the early years of the epidemic. Then the mortality from PCP was of the order of 80 per cent, as patients often presented late and physicians were inexperienced in dealing with the infection. Now, with awareness heightened in both patient and physician, and the use of improved diagnostic techniques and treatment options, the mortality has been reduced to about 10 per cent.

There has been progress with several antiviral therapies, most notably with zidovudine, or AZT. Zidovudine was first licensed in 1987 after the initial placebo-controlled trial of its use in patients with AIDS was interrupted prior to its completion. It was felt unethical to continue to give the drug only

to the treatment group after 19 of the placebo patients had died compared with only one receiving zidovudine.

Despite criticisms of this first study, the drug has been administered to several thousand patients, mostly in North America and Europe. Certainly in patients with AIDS and ARC (AIDS-related complex) it prolongs survival and decreases the severity of opportunistic infections. As far as its extension to other parts of the world is concerned, the cost is prohibitive for most countries. According to Dr Jonathan Mann, former head of the Global Programme on AIDS at the World Health Organization, the total cost of the average national AIDS programme is less than the cost of caring for 15 AIDS patients in the United States for a year.

The question of whether zidovudine is of benefit to patients who are asymptomatic and HIV positive has been addressed by two large American studies. The suggestion is that patients who are becoming immunosuppressed may benefit from low-dose zidovudine. Zidovudine is the only licensed drug for use in patients with HIV infection but another drug, ddI, which is similar to zidovudine but has a different profile of side-effects, is currently being investigated.

When drugs such as zidovudine are unavailable, the management of opportunistic infections becomes even more important.

*Pneumocystis carinii* pneumonia (PCP) is the most common infection in patients in industrialized countries; the mainstays for treatment of the acute infection are high dose intravenous septrin, or pentamidine when patients are allergic or not responding to septrin. However, people with AIDS often suffer quite severe side-effects from both these drugs. In recent years, pentamidine—which has many side-effects when given intravenously—has been administered via a nebuliser with some success, not only for treatment of the acute infection but also for prophylaxis.

Prophylaxis of PCP either to prevent a recurrence or to prevent a first attack is an area that has become highly developed in recent years. It is clear now that where possible prophylaxis should be offered to every patient who has had an attack of PCP as the likelihood of recurrence is high.

Oral candida is often seen in people with HIV and can become widespread, extending to the oesophagus. It can usually be controlled successfully by a variety of antifungal drugs such as nystatin, ketoconazole or the more recently developed fluconazole.

Cryptococcal meningitis, which can affect the central nervous system, is difficult to diagnose and treat. The preferred treatment is intravenous amphotericin though this has many side-effects. Fluconazole has recently been used as an

adjunct to therapy; it can reduce the duration of the amphotericin phase and further can be used as maintenance treatment.

Cytomegalovirus (CMV) is a viral opportunistic infection which has a high prevalence in homosexual men and can give rise to a sight-threatening retinitis. This had been difficult to treat and responsible for considerable morbidity until the recent development of ganciclovir (DHPG), which has anti-CMV activity and can halt progression of the retinitis. Increased awareness of this infection and early diagnosis can result in more successful treatment. DHPG is also an example of a drug which has been developed since the HIV epidemic. DHPG and foscarnet—another drug with anti-CMV and some anti-HIV activity—have also been useful in treating other complications of CMV, for example pneumonitis and colitis.

In developing countries, especially in sub-Saharan Africa, tuberculosis is a particularly common oppor-

tunistic infection. Standard quadruple therapy is usually successful, though following treatment patients need to remain on maintenance therapy lifelong. Any contacts, particularly those who are immunocompromised because of HIV, should be closely monitored.

The treatment of patients with *Mycobacterium avium intracellulare* (MAI) is not so successful, although this is becoming an increasingly apparent problem and is the cause of much morbidity. MAI tends to be resistant to many of the standard anti-TB drugs though some studies suggest that a combination of several of them, including the more recently developed agents such as rifabutin and ansamycin, may be helpful. The use of steroids in these patients may reduce symptoms such as night sweats and fever quite successfully, but, of course, may be immunosuppressive in themselves.

Toxoplasmosis, a protozoal infection which attacks the central ner-

vous system, is usually treated by folate antagonists such as sulphadiazine and pyrimethamine with some success. After treatment of the acute infection, maintenance should be offered also in the form of folate antagonists. Recent studies have suggested that toxoplasmosis is an infection unlikely to occur unless the patient is severely immunosuppressed, say with a CD<sub>4</sub> count of less than 150. It has been suggested that we should consider giving prophylaxis to patients with low CD4 counts of this order.

The amount of scientific and clinical data which has been collected over the last decade has led to an enormous increase in the understanding of the natural history of the disease. Even without the use of specific anti-HIV therapies, physicians can make a significant impact by prompt diagnosis, treatment where possible and prophylaxis of the many and varied opportunistic infections.

Courtesy: AIDS Watch—12, 1990

(Contd. from page 304)

### Immunity in parasitic and helminthic infections

Antibodies are usually effective against the blood borne parasites. Organisms like *Leishmania* Spp, *Toxoplasma gondii* hide from antibodies inside the macrophages and use the same strategy on intracellular parasitic bacteria to survive and like them are killed when the macrophages are activated by lymphokines produced during cell mediated immune response. IgE production is notoriously increased in worm infestations and can lead to mast cell mediated influx of immunoglobulin and eosinophils. Parasites like *Schistosoma* coated with IgG or IgE are killed by adherent eosinophils.

### SUMMARY OF IMMUNE RESPONSE TO MICROORGANISMS

#### Induction Stage

1. Microbe breaks through innate immune mechanisms and is taken up by inducer cell (macrophage, dendritic cell).
2. Microbial antigens (processed) associated with MHC product presented to T helper cells.
3. Interleukin I from macrophages stimulates T helper cells which produce Interleukin-2.

#### Effector Stage

1. Macrophages produce interferon which stimulates the natural killers cells that attack virus infected cells

and prevents viral infection of the contiguous cells.

2. Interleukin-2 from T helper cells stimulates formation of T cytotoxic cells that kill virus infected cells and leads to the production of chemotactic factors and macrophage activating factor that attract cells and activate macrophages to kill intracellular organisms.
3. Interleukin-2 activates B cells to produce antibodies.
4. Antibody kills microorganisms with complement, brings about opsonisation and phagocytosis and coats the virus infected cell so that cells with Fc receptors (e.g., macrophages and killer cells) can destroy infected cell.

# AIDS—A SELECTED BIBLIOGRAPHY (1989-90)

K. BASRA

We publish below a selected bibliography on AIDS compiled by the National Medical Library (DGHS) as part of its activities aimed at providing Documentation Services to the Health Science Community in the country. It covers selected contributions on AIDS during 1989-90. This is an update of 1988-89 bibliography published in *Swasth Hind* (December 1989). Entries follow a classified arrangement using main subject, headings and sub-headings.

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